

Arithmetic Exercises

FOR THIRD GRADE CLASSES

G. W. BENTLEY, AUTHOR

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"SCHOOL HELPS" SERIES.

ARITHMETIC EXERCISES

FOR THIRD BOOK CLASSES

BY

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AND

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PREFACE.

The authors of this series of Arithmetic "School Helps" offer no apology to the school public for the placing of their books as candidates for popular favor. The several numbers of the series are prepared by teachers actively engaged in the busy work of the schoolroom, and as teachers they know the great difficulty that the average teacher encounters in the presentation of new and crisp problems for his Arithmetic classes.

The authors would most respectfully request a consideration of the following points in connection with their series :—

I. Mechanical Work. After pupils have passed the Second Reader the usual text books provide but very scanty practice in the mechanical operations. Pupils instead of becoming swifter and more accurate as they advance in years frequently lose the speed and accuracy which they had acquired in the lower forms. To meet this difficulty the present series provides over 5,000 operations in mechanical work, which the teacher will find tested for him without the labor (and loss of time) of performing the work himself. This feature alone should commend the present series to every teacher of the subject.

II. No Answers. In the Pupils' Edition no answers are provided; the Teachers' Edition alone contains the answers.

III. Saving in Time. The time of the teacher is too valuable to be taken up in the dictation of problems to a class, when for a mere trifle each pupil may be provided with a set of exercises for himself.

IV. Writing. The possession of these exercises by the scholars will tend to preserve his handwriting—it prevents the mad rush in copying questions from dictation.

V. Understanding of Terms. Without giving formal definitions of terms, problems are specially constructed to fix in the pupil's mind a thorough understanding of the technical terms of Arithmetic.

VI. New Problems. The great majority of the problems of the series have been written specially for these "School Helps." They are not simply a re-arrangement of old, stereotyped problems.

VII. Problems Grouped. The problems are not arranged in the ordinary "hit and miss" fashion, but are grouped according to types, and carefully graduated in degree of difficulty.

VIII. Time Tests. The purely mechanical operations of addition, subtraction, etc., are intended to be done at a pupil's best speed, a specified time being allowed as the teacher's experience finds suited to the ability of his class.

IX. Book of Exercises. This series is not in any sense designed to displace either the teacher or the authorized text. There is no attempt to show how to teach; this is taken for granted. It merely furnishes ready to the teacher's hand bright, crisp, new problems with which to enforce his teaching.

THE AUTHORS.

Toronto, August, 1897.

62
312
76
512
76
12

(
361
212
622
524
458
468
697
644
329
518

line
to)

MECHANICAL WORK.

Exercise I.—ADDITION.

(1)	(2)	(3)	(4)
625456	279807	876390	507648
312215	502136	763769	727659
763617	796736	507648	307523
512215	452432	727659	423237
767806	967875	432140	876948
123432	234345	541546	768275
(5)	(6)	(7)	(8)
361221	642272	423426	782167
212132	347447	709151	481311
622231	872638	820737	591479
524123	615465	253897	611512
458416	421641	541111	703608
468495	879848	422343	122291
697261	956925	735625	914572
644605	508575	156851	234210
329185	467259	481318	357444
518768	752342	423805	452468

Without putting the figures down.

(9) Add 4's (the same number of 4's in each successive line as there are figures in the line they are being added to) successively ten times, beginning with the line 96843.

(5)

(10) Add 5's to the same line. (11) Add 6's. (12) Add 7's. (13) Add 8's. (14) Add 9's. (15) Add 4's and 9's alternately. (16) Add 5's and 8's alternately. (17) Add 6's and 7's alternately.

$$\begin{array}{r}
 (18) \quad 357433 + 552729 + 526063 + 169962 = \\
 578834 + 218272 + 378831 + 827946 = \\
 269365 + 173228 + 547328 + 143478 = \\
 121268 + 739561 + 266721 + 434747 = \\
 676277 + 395587 + 821185 + 382427 = \\
 810468 + 404432 + 415073 + 678913 = \\
 \hline
 + \qquad + \qquad + \qquad =
 \end{array}$$

$$\begin{array}{r}
 (19) \quad 848703 + 722514 + 635313 + 433827 = \\
 221712 + 823135 + 288174 + 563725 = \\
 342277 + 684718 + 583186 + 434958 = \\
 563821 + 516813 + 642082 + 367624 = \\
 820818 + 902802 + 752196 + 233647 = \\
 237833 + 656912 + 874314 + 454739 = \\
 \hline
 + \qquad + \qquad + \qquad =
 \end{array}$$

$$\begin{array}{r}
 (20) \quad 285135 + 722445 + 821745 + 276287 = \\
 472244 + 182174 + 714924 + 762875 = \\
 318217 + 714924 + 584627 + 875697 = \\
 187149 + 358462 + 647287 + 756978 = \\
 735846 + 513534 + 728733 + 783457 = \\
 851353 + 224456 + 873346 + 875438 = \\
 \hline
 + \qquad + \qquad + \qquad =
 \end{array}$$

Exercise II.—SUBTRACTION.

$$\begin{array}{r}
 (1) \\
 625456763 \\
 312215512 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 (2) \\
 876390763 \\
 432137698 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 (3) \\
 825721423 \\
 376948768 \\
 \hline
 \end{array}$$

MECHANICAL WORK

7

(12) Add
4's and 9's
(17) Add

(4)
825125427
327587998

(5)
823012345
759158576

(6)
713627230
273976735

(7)
514723272
278976785

(8)
627211335
378589657

(9)
914232013
267548129

Subtract 213987854 from each of the following :

- (10) 373967873 ; (11) 972725879 ; (12) 958378327 ;
(13) 721285113 ; (14) 813246201 ; (15) 512346513 ;
(16) 931467842 ; (17) 712353768 ; (18) 472051997 ;

(19) Without putting the figures down, subtract lines of 3's successively, from 62447901224, as far as the seventh remainder.

(20) Subtract in succession 4's from the above number as far as the seventh remainder.

(21) Subtract 5's. (22) Subtract 6's. (23) Subtract 7's. (24) Subtract 8's. (25) Subtract 9's.

(26) Find by repeated subtraction how often 73869745 can be taken from 592410478, and give the remainder.

(27) Find by repeated subtraction how often 416897543 can be taken from 3966641141, and give the remainder.

(28) Find by repeated subtraction how often 975318642 can be taken from 10187754329, and give the remainder.

Exercise III.—MULTIPLICATION.

Multiply each of the following by 357 :—(1) 180342 ;
(2) 240456 ; (3) 270513 ; (4) 360684 ; (5) 541026 ; (6) 811539.

Multiply each of the following by 468 :—(7) 122553 ;
(8) 163404 ; (9) 245106 ; (10) 367659 ; (11) 490212 ; and
(12) 735318.

Multiply each of the following by 987:—(13) 132456;
(14) 264912; (15) 397368; (16) 529824; (17) 794736; and
(18) 927192.

Multiply each of the following by 3456:—(19) 143712;
(20) 191616; (21) 287424; (22) 431136; (23) 574848; and
(24) 862272.

Find the product arising from the multiplication of
each of the following:—21867; 29156; 43734; 65601;
and 87468.

- (25) Using 4 as a factor seven consecutive times.
- (26) Using 5 as a factor seven consecutive times.
- (27) Using 6 as a factor seven consecutive times.
- (28) Using 7 as a factor seven consecutive times.
- (29) Using 8 as a factor seven consecutive times.
- (30) Using 9 as a factor seven consecutive times.

Multiply each of the following consecutively by the
eight digits 2, 3, 4, 5, 6, 7, 8, 9, as factors:—(31) 13257;
(32) 17676; (33) 26514; (34) 35352; (35) 39771; (36)
53028; (37) 70704; and (38) 79542.

Find the squares of each of the following:—(39) 13112;
(40) 13167; (41) 17556; (42) 26334; (43) 39336; (44)
39501; (45) 52668; and (46) 79002.

Find the products of 197 and each of the following
numbers:—(47) 12288; (48) 13824; (49) 16384; (50)
18432; (51) 24576; (52) 27648; (53) 32768; (54) 36864;
(55) 49152; and (56) 55296.

Exercise IV.—DIVISION.

Divide each of the following by 12:—(1) 13769154;
(2) 15299060; (3) 18358872; (4) 27538308; (5) 30598120;
(6) 55076616; (7) 82614924; and (8) 91794360.

Divide each of the following by 19:—(9) 13370832;
(10) 15042186; (11) 20056248; (12) 26741664; (13)
40112496; (14) 53483328; (15) 60168744; (16) 80224992.

Divide each of the following by 437:—(17) 18657278;
(18) 27985917; (19) 37314556; (20) 55971834; (21)
74629112; and (22) 83957751.

(23) Divide 8635547648 consecutively by 4 for 8 quotients.

(24) Divide 5123828125 consecutively by 5 for 8 quotients.

(25) Divide 39430665216 consecutively by 6 for 8 quotients.

(26) Divide 81422872867 consecutively by 7 for 8 quotients.

(27) Divide 394969219072 consecutively by 8 for 8 quotients.

(28) Divide 506573812728 consecutively by 9 for 8 quotients.

(29) $3552714396 \div 726$.

(30) $3489514378 \div 406$.

(31) $445886497875 \div 4875$.

(32) $5963879065 \div 9307$.

(33) $2975019839 \div 5423$.

(34) $11516639848344 \div 704006$.

Exercise V.—REVIEW EXAMPLES.

A.

(1) Multiply the difference between 4396408 and 9206000 by 346 .

(2) What is the product of 67489 and 758 ?

(3) Find the quotient and remainder when the product of 86947 and 496 is divided by 387 .

(4) A man bought 26 cows at $\$32$ each, and 117 sheep at $\$6$ each. How much less than two thousand dollars did he pay out?

(5) A man earns $\$22$ a month and spends $\$14$ of it. How long will it take him to save as much as he earns in a year?

(6) Multiply the sum of the numbers between 38 and 52 by 769 .

(7) In an orchard there are 7 rows of trees and 18 in each row; five barrels of apples are got from every two trees. What is the crop?

(8) Find the sum, difference, product and quotient of 264 and 1753.

(9) A boy steps two feet each time and takes 100 steps in a minute. What distance will he walk in an hour?

(10) A lady buys 3 yards of cloth at 88 cents a yard; 17 yds. of calico at 12 cents a yard; and 4 pairs stockings at 45 cents a pair. How much change does she receive out of a \$10 bill?

B.

(1) A farmer has 24 cows and 93 sheep worth \$1,521. If the sheep are worth \$5 each, how much is each cow worth?

(2) How much less than four thousand and forty is the sum of the numbers beginning with 248 and ending with 259?

(3) A grocer bought 15 tubs of butter, each containing 48 pounds at 28 cents a pound, and sold the same at 35 cents a pound. What was his gain?

(4) A farmer owes \$50. He gave in part payment 146 bushels of oats at 27 cents a bushel. How much does he still owe?

(5) If the doors of 6 houses cost \$175.50; what is the cost of one door—there being 9 in a house?

(6) If 59 books cost \$43.07, for how much must I sell 23 of them to gain 183 cents on those sold?

(7) William was born in 1823; John was born 16 years sooner, and died at the age of 52. In what year did he die?

(8) At the rate of \$2.25 a day, how much will 15 men earn in four weeks?

(9) A man sells 5 cows at \$55 each, and a yoke of oxen for \$125. He takes in payment 80 sheep. What does a sheep cost?

(10) Divide the sum of 73859, 4637 and 59428 by 684.

C.

(1) A farmer received \$401 for 21 sheep and 43 lambs. He got \$2 each for the lambs: how much did he get for a sheep?

(2) If 11 men can sod an acre of ground in 12 days, how many days will 4 men take to do the same work?

(3) Multiply 76493 by 8973.

(4) A man sold chickens that cost him 35 cents each, for 76 cents a pair, and gained \$2.70. How many pairs did he sell?

(5) What number subtracted 88 times from 80005, will leave 13 as a remainder?

(6) Write in figures: seventeen thousand and eight; nine hundred and one thousand six hundred and four; eight hundred thousand and two; $\overline{\text{XCVII}}$; $\overline{\text{CD}}$; $\overline{\text{CCCV}}$ and $\overline{\text{XLIV}}$.

(7) Divide 121 marbles between John and Tom, giving Tom 19 more than John.

(8) What will a telegram of 44 words cost, if you have to pay 25 cents for the first 15 words and 2 cents for each of the remaining words?

(9) A boy was told to multiply 720 by 304, and gave as his answer 24480. By how much did his answer differ from the correct product?

(10) How many bushels of wheat at 69 cents a bushel should be given for 6210 pounds of sugar @ 5 cents a pound?

REDUCTION.

Exercise VI.—DOLLARS AND CENTS.

- (1) Reduce \$8, \$79, \$50, \$100, each to cents.
- (2) Reduce each of the following to cents :—\$7.63, \$70.01, \$.10, \$.09.
- (3) How many cents in $\$5 + \$8 + \$58 + \$85$?
- (4) Find the sum in cents of \$8.19, \$.70, \$187.04 and \$11.90.
- (5) How many cents is \$17.18 less than \$81.17?
- (6) How many five-cent pieces in \$9.40?
- (7) How many cents in three five dollar bills?
- (8) How many quarters in \$23.75?
- (9) How many ten-cent pieces in \$98.90?
- (10) How many five-cent pieces in $\$1.10 + \$2.25 + \$3.30 + \$4.45$?
- (11) Reduce to dollars and cents :—(1) 418 cents ; (2) 800 cents ; (3) 3457 cents ; (4) 1209 cents ; (5) 6064 cents ; (6) 34162 cents ; (7) 60084 cents ; (8) 20003 cents ; (9) 400089 cents ; and 1908190 cents.

Exercise VII.—TIME.

A.

- (1) Write the table.
- (2) How many seconds in 6 minutes ; in 13 minutes , in 1 hour ; in 7 hours ?

(12)

(3) How many seconds in 1 day ; in 1 week ; in 19 days ; in $2\frac{1}{2}$ weeks ?

(4) How many seconds in 5 hours, 7 minutes ; in 12 hours, 51 minutes, 37 seconds ?

(5) How many seconds from 6 o'clock a.m., to 7 o'clock p.m. ?

(6) How many minutes in a year ? How many minutes in a leap year ?

(7) How many seconds in the year 1897 ?

(8) How many hours in the month of January ? in the month of September ?

(9) How many days in the spring months ? in the summer ? in the autumn ? in the winter ?

(10) How many days are there in four centuries ?

B.

(1) How many seconds in 17 days, 5 hours, 15 minutes and 35 seconds ?

(2) How many minutes in 180 seconds ? in 1980 seconds ?

(3) How many hours in 10800 seconds ? in 183600 seconds ?

(4) How many hours, etc., in 34896 seconds ?

(5) Reduce 28974 minutes to days, etc.

(6) How many weeks, etc., in 2308589 seconds ?

(7) How many days from August 24, 1896, to January 7, 1897 ?

(8) How many Saturdays in 1897, Friday being the first day of the year ? How many Fridays ?

(9) If a clock ticks seconds, how many times did it tick in February, 1896 ; in February, 1897 ?

(10) Reduce 8 years, 340 days, 17 hours, 57 minutes to seconds, reckoning 365 days to the year.

Exercise VIII.—DRY AND LIQUID MEASURES.

(1) Write the tables.

(2) How many pints are there in three quarts ? 1 gallon ? 1 peck ? 1 bushel ?

(14)

ARITHMETIC

- (3) How many pint tins of berries in 6 gallons, 2 quarts, 1 pint?
- (4) How many bushels, etc., of nuts in 2774 quarts?
- (5) What is the value of 1713 bushels of potatoes at 9 cents a peck?
- (6) How many quart bottles of berries could be filled from a large basket containing 2 bushels, 3 pecks, 1 gallon?
- (7) How many quarts of cherries in 12 pails, if each pail contains three-fourths of a peck?
- (8) A fruit dealer bought 5 bushels of cherries at \$2.25 a bushel, and sold them at 15 cents a quart; find his gain.
- (9) If 10 bushels of peaches be sold for \$16, what price per quart is obtained for them?
- (10) How long should 18 bushels of oats last a horse which receives 12 quarts a day?
- (11) If 45 bushels of potatoes are bought for 42 cents a bushel and retailed at 8 cents the half peck, find the gain.
- (12) If four pints of plums cost 16 cents, how much more will 12 quarts cost than 9 quarts?

(B.)

- (1) Find the value of 5 bushels, 3 pecks, 1 gallon, of cherries at 7 cents a quart.
- (2) If 20 pecks of oats are worth 24 gallons of wheat, how many pounds of wheat are equal to 1870 pounds of oats?
- (3) When 4 gallons of rye are worth 48 cents, what is the value of 1218 pounds of rye?
- (4) Find the cost of 12 bushels, 2 pecks of grass seed at \$6 a bushel.
- (5) Find the cost of 15 bushels of crab apples at 1 cent the quart.
- (6) Find the value of 15 pecks, 3 quarts of berries at 10 cents a pound, assuming 3 quarts to be equal to 4 pounds.
- (7) How many gallons in 1696 pints of milk, and what is it worth at 18 cents a gallon?

(8) How many pint bottles will be required to hold 6 gallons, 3 quarts, 1 pint of vinegar?

(9) A grocer bought 2 barrels ($31\frac{1}{2}$ gallons each) of syrup for \$15. He sold half of it at 18 cents a quart, and the remainder at 22 cents a quart. How much did he gain?

(10) Find the cost of 23 gallons, 3 quarts of vinegar at five cents a quart.

(11) If \$10 was paid for a barrel of molasses, which was retailed at 20 cents a quart, find the gain.

Exercise (IX)—AVOIRDUPOIS WEIGHT.

A.

(1) Write the table.

(2) How many lbs. in 4 cwt.? 7 cwt.? 1 ton? 8 tons? 6 cwt., 53 lbs.? 14 cwt., 90 lbs.? 14 tons, 13 cwt., 79 lbs. in 14 stone?

(3) How many ounces in 8 lbs.? 25 lbs.? 3 cwt.? 2 cwt., 15 lbs.? 11 cwt., 82 lbs., 14 oz.?

(4) How many lbs. in 1 bbl. of flour? 1 bbl. pork or beef? in 1 bbl. salt?

(5) How many pounds in a bushel of each of the following: Wheat, peas, potatoes, clover seed, corn, rye, barley, buckwheat, timothy seed, oats?

(6) How many grains in 1 pound avoirdupois? in 1 ounce? in 8 ounces? in half a pound? in $1\frac{1}{2}$ pounds?

(7) How many ounces in 19 tons, 12 cwt., 73 lbs., 15 oz.?

(8) Reduce 3 cwt., 15 lbs., 8 oz. to grains.

(9) Reduce 13579 ounces to higher denominations.

(10) How many bushels of wheat in 3 tons, 4 cwt., 20 lbs.?

(11) Bought flour at \$7 per bbl., and sold it at \$4 per cwt. Find the gain on 27 bbls.

(12) Find the cost of 1365 lbs. of hay at \$12 the ton.

(13) If an ounce of sugar cost half a cent, what will 2 cwt., 15 lbs., 12 oz. cost?

ARITHMETIC

B.

- (1) How many cwt., etc., make 5767 ounces?
Find the value of:
- (2) 2750 lbs. of wheat at 90 cents per bushel.
 - (3) 2584 lbs. of oats at 43 cents per bushel.
 - (4) 2704 lbs. of barley at 64 cents per bushel.
 - (5) 1896 lbs. of timothy seed at \$1.42 per bushel.
 - (6) 1896 lbs. of clover seed at \$5.10 per bushel.
 - (7) 7313 lbs. of Indian corn at 32 cents per bushel.
 - (8) 8964 lbs. of peas at 45 cents per bushel.
 - (9) Find the worth of a load of wheat weighing 4185 lbs. at 96 cents per bushel?
 - (10) A farmer at the market disposed of his load as follows: 5 bags of potatoes at 85 cents a bag; 153 lbs. of oats at 40 cents a bushel; and 660 lbs. of barley at 52 cents a bushel. How much did he receive for all?
 - (11) An Englishman when asked his weight, said he weighed 13 stone, 10 pounds. His companion weighed 195 pounds. Find the sum of their weights.

Exercise X.—TROY WEIGHT.

- (1) Write the table.
- (2) How many grs. in 7 dwts.? in 13 dwts.? in 1 oz.? in 3 oz. 3 dwts.?
- (3) How many grs. in 7 oz., 5 dwts., 13 grs.? in 5 lbs., 11 oz., 19 dwts., 23 grs.?
- (4) What is the value of an ornament, weighing 3 oz. 13 dwts., at \$1.75 per dwt.?
- (5) In 1746 grs., how many ounces, etc.?
- (6) Find the number of grs. in 12 lbs., 1 oz., 10 dwts., 2 grs.?
- (7) How many grs. of silver in a quarter of a pound?
- (8) How many lbs., etc., in 1 million grs.?
- (9) How many doz. spoons, each weighing 2 oz., can be made from 13 lbs., 8 oz.?
- (10) What is the value of a gold bracelet weighing 1 oz., 14 dwts., at \$20 an ounce?
- (11) Reduce 123 lbs. to grs.

(12) Which is the heavier, 1 lb. of feathers or 1 lb. of gold? 1 oz. of feathers or 1 oz. of gold? How much heavier, give your answer in grains?

(13) How many pounds Troy, in 15 lbs. Avoir., and how many grains over?

(14) How many pounds Avoir. in 15 lbs. Troy, and how many grains over?

Exercise XI.—APOTHECARIES' WEIGHT.

- (1) Write the table.
- (2) How many grs. in 2 scr.? in 1 dram.? in 1 oz.? in 1 lb.?
- (3) Reduce 6 lbs., 5 drs., 1 scr., 19 grs. to grains.
- (4) In ten thousand grs., how many lbs., etc.?
- (5) How many grains of calomel in 11 oz., 2 scr.?
- (6) Find the number of lbs., etc., in 791 scr.?
- (7) How many morphine powders of 1 gr. each can be made from 2 lbs., 2 oz., 3 drs., 2 scr., 7 grs.?
- (8) Which is the heavier, 1 lb. Troy, or 1 lb. Apoth.?
- (9) How many pounds Apoth., in 20 lbs. Avoir., and how many grains over?

Exercise XII.—LONG MEASURE.

A.

- (1) Write the table.
- (2) How many inches in 2 ft.? in 7 ft.? in 5 ft.? in 14 ft.?
- (3) How many inches in 1 yd.? in 5 yd.? in $\frac{1}{2}$ a yd.?
- (4) Express in yards 1 rod; 4 rods; 1 mile; $1\frac{1}{4}$ miles.
- (5) How many feet are there in 3 miles? in 5 miles? in 16 miles?
- (6) How many inches in 3 yards, 2 feet, 11 inches?
- (7) Reduce 6 miles, 24 rods, 3 yards to yards.
- (8) How many inches in 25 miles, 78 rods, 4 yards, 3 feet, 5 inches of distance?

- (9) Reduce 19 miles, 200 rods to rods.
- (10) Reduce 123 miles, 150 rods, 3 yards, 2 feet, 41 inches to inches.
- (11) Reduce 4 miles, 425 yards, 2 feet, 4 inches to inches.
- (12) How many inches in 3 miles, 5 furlongs, 32 rods, 4 yards, 1 foot, 7 inches?

B.

- (1) Express 1239 inches in yards, feet and inches.
- (2) Express 76298 yards in miles and yards.
- (3) Express 64936 inches in miles, yards, etc.
- (4) Reduce 64789 inches to miles, yards, etc.
- (5) Reduce 321467 feet to miles, yards, feet.
- (6) Reduce 8647 rods to miles and rods.
- (7) Reduce 4708937 inches to miles, yards, etc.
- (8) Reduce 75680 inches to miles and inches.
- (9) A field is 9876 inches long and 7964 inches wide. Express the distance around the field in terms of rods and inches.
- (10) Reduce 9482067 inches to miles, yards and inches.
- (11) Express twenty thousand feet in miles and feet.

Exercise XIII.—SQUARE MEASURE.

A.

- (1) Write the table of square or land measure.
- (2) Show by a diagram the number of square inches in a square foot.
- (3) Show by a diagram also the number of square feet in a square yard; and the number of square yards in a square rod.
- (4) How many square inches in a square foot? in a square yard?
- (5) A table is 10 feet by 5 feet; how many square feet of surface? How many square inches?
- (6) A piece of board is 12 inches by 6 inches, and another piece is 16 inches by 5 inches. How many square inches in each board?

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- (7) How many square inches in 5 square yards, 8 square feet, 73 square inches?
 (8) How many square yards in 4 square rods? in 6 square rods? in 12 square rods?
 (9) Reduce 2 square rods to square inches.
 (10) How many square yards in a blackboard 36 feet long and $4\frac{1}{2}$ feet wide?

B.

- (1) How many square yards in 1 acre?
 (2) Express 8 acres in square rods.
 (3) A cellar is 36 feet long by 24 feet 6 inches wide. How many square yards in the floor?
 (4) What is the difference in square feet between 10 square feet and 10 feet square? in square inches? in square yards?
 (5) How many square feet of carpet are required for a hall 39 feet long and 24 feet wide? How many square yards?
 (6) Reduce to acres and square rods each of the following: 1000 square rods; 1250 square rods; 1325 square rods.
 (7) How many acres and square yards in each of the following: 5697 square yards; 71934 square yards; 83040 square yards?
 (8) How many acres in a lot 200 rods by 80 rods?
 (9) A ten-acre field is 80 rods long. Express the distance around the field in yards.
 (10) Reduce 8642898 square inches to acres, etc.

C.

- (1) Find the number of acres in the following fields;
 72 rods by 40 rods; 75 rods by 32 rods; 80 rods by 36 rods; 140 rods by 96 rods; 100 rods by 96 rods.
 (2) How many acres in fields whose dimensions are:
 23 chains by 10 chains; 32 chains by 25 chains; 49 chains by 70 chains; 63 chains by 35 chains; 48 chains by 85 chains?

*multiply together
 divide by 60
 multiply
 divide
 20 10*

(3) How many acres in fields whose lengths and widths respectively are : 26 rods by 10 chains ; 64 rods by 35 chains ; 240 chains by 96 rods ; 100 chains by 144 rods ; 100 rods by 144 chains ?

(4) How many square yards are there in the walls of a room, 21 feet long, 15 feet wide and 13 feet high ?

(5) A room is 24 feet long, 18 feet wide and 15 feet high. How many square yards are there in the walls and ceiling ?

(6) The perimeter of a rectangular plot of ground is 400 feet. The difference between the length and breadth is 36 feet. How many square inches are in the plot ?

(7) The top of a table 30 inches wide, contains 10 square feet. What is the length ?

(8) How many yards of carpet 27 inches wide will cover 30 square yards ?

(9) A square yard of paper is cut into rectangular pieces 3 inches by 2 inches. How many pieces are there ?

D.

(1) How many pupils would a rectangular school-room 40 feet long, 32 feet, 6 inches wide accommodate, allowing 10 square feet of floor for each pupil ?

(2) How many acres, etc., are there in a square field, a side of which is 7260 feet ?

(3) Find the cost of sodding a lawn 66 feet long, 16 yards, 2 feet wide, at 6 cents per square yard.

(4) Reduce 7964820 square inches to acres, etc.

(5) If a road is 4 rods wide, how many yards of it will make 6 acres ?

(6) At \$125 an acre, what is the value of a farm 240 rods long and 90 rods wide ?

(7) At 2 cents a square foot, find the cost of fencing 1 mile of a railway track, both sides, with a close board fence 4 feet high.

(8) What will it cost to pave a roadway 2 miles long and 15 feet wide at \$1.50 a square yard ?

(9) Find the price of a piece of land 86 miles long and 4 rods wide, at \$44.50 an acre.

Exercise XIV.—CUBIC MEASURE.**A.**

- (1) Write the table of cubic or solid measure.
- (2) Show by diagrams the number of cubic feet in a cubic yard; the number of cubic feet in a cord; and the number of cubic inches in a cubic foot.
- (3) How many cubic in. are there in a cubic ft.; in 5 cubic ft.; in 17 cubic ft.?
- (4) How many cubic ft. in 3 cubic yds.; in 7 cubic yds.; in 23 cubic yds.?
- (5) How many cubic in. in a cube, one edge of which is 2 ft.?
- (6) What is the volume of a solid 8 ft. long, 5 ft. wide and 3 ft. thick?
- (7) How many cubic ft. of earth must be removed in digging a cellar 15 ft. long, 10 ft. wide, and 6 ft. deep? How many cubic yds.?
- (8) How many cubic yds. in a cellar 27 ft. long, 15 ft. wide and 7 ft. high?
- (9) How many cubic ft. in a block of stone 13 ft. long, 11 ft. wide and 17 ft. thick?
- (10) How many cords of wood are in a pile 242 ft. long, 28 ft. wide and 12 ft. high?
- (11) A sleigh upon which 4-foot wood is piled is 10 ft. long. How high should the wood be piled to make a cord?
- (12) How many bricks are required to build a wall 35 ft. long, 12 ft. high and 2 ft. thick, if 21 bricks with the mortar would make a cubic foot of wall?

B.

- (1) Find the value of a pile of tan-bark 128 ft. long, 40 ft. wide, and 16 ft. high, at \$3.25 a cord.
- (2) How many cords of wood can be piled into a woodshed 20 feet square and 16 ft. high?
- (3) A box 24 in. long, 16 in. wide and 18 in. deep will contain about 3 bushels. How many bushels of wheat are in a bin 12 ft. long, 6 ft. wide and 5 ft. deep?

- (4) How many cut stones, each 8 in. by 4 in. by 5 in., will it take to construct a wall a quarter of a mile long, 16 feet thick and 24 feet high?
- (5) How many cubic yards of gravel will be required for $4\frac{1}{2}$ miles of road, the gravel to be laid 9 ft. wide and averaging 8 in. deep?
- (6) Find the value of a pile of cordwood 87 ft. long and 3 ft. 10 in. high, at \$2.75 a cord.
- (7) Find the cost of a pile of wood 32 ft. long, 12 ft. wide and 5 ft. high, at \$1.75 a cord.
- (8) What will it cost to dig a cellar 20 ft. long, 18 ft. wide and $6\frac{1}{2}$ ft. deep, at 24 cents per cubic yard?
- (9) Find the cost of digging a cellar $35' \times 24' \times 9'$, if 7 cubic yards cost \$9.
- (10) A person sold a pile of wood measuring 64 ft. long, 6 ft. high and 6 ft. wide, getting \$4.25 a cord for 14 cords, and \$3.75 a cord for the rest of it. How much did he receive for the wood?
- (11) A woodshed 24 ft. long, 20 ft. wide and 8 ft. high is half filled with wood. Find its value at \$3.25 a cord.
- (12) What must be the width of a box 6 ft. long, 4 ft. high to contain a cord of wood?

C.

- (1) Find the total cost of digging a cellar 48 ft. long, 30 ft. wide and 6 ft. deep, at 20 cents per cubic yard, and flooring it with Portland cement at 10 cents per square yard.
- (2) What is the value of a pile of four-foot wood, the pile being 6 ft. high and 20 ft. long, at \$4 per cord?
- (3) A pile of cordwood is 7 rods, 6 yds. long and 6 ft. high; find its value at \$1.60 per cord.
- (4) There is a pile of cordwood $48' \times 4' \times 5'$. How many cords has the owner left after taking away \$18 worth, wood being worth \$2.25 a cord?
- (5) How many bushels of wheat are there in a rectangular bin $8' \times 4' \times 6'$? A cubic foot contains 25 quarts.
- (6) A rectangular cistern is $4' \times 4' \times 3'$. How many gallons does the cistern hold?

(7) What must be the length of a rectangular bin 4 ft. wide by 5 ft. 4 in. deep to hold 300 bushels?

(8) A gallon of water weighs 10 pounds. Find the weight of water in a rectangular cistern 6 ft. long and 3 ft. wide, the water in the cistern being 1 ft. 4 in. deep.

(9) There are $31\frac{1}{2}$ gallons in a barrel. How many barrels of water are there in a rectangular water tank 6 ft. 9 in. wide, 7 ft. long and 5 ft. 4 in. deep?

(10) A cubic foot of water weighs 1000 ounces. How many pounds are there in a rectangular cistern 9 ft. long, 4 ft. wide, the water in it being 2 ft. 6 in. deep?

(11) To drain a swamp in Dereham, the township council had a ditch dug one mile long, 3 ft. deep and 6 ft. wide at the surface, and 4 ft. wide at the bottom. Find the total cost at 9 cents per cubic yard.

Exercise XV.—BOARD MEASURE.

A.

How many feet, board measure, are there in :

- (1) 1 board, 12 ft. long, 12 in. wide and 1 in. thick?
- (2) 3 boards, 14 ft. long, 16 in. wide and 1 in. thick?
- (3) 4 boards, 16 ft. long, 9 in. wide and 1 in. thick?
- (4) 12 boards, 14 ft. long, 10 in. wide and 1 in. thick?
- (5) 42 boards, 16 ft. long, 8 in. wide and 2 in. thick?
- (6) 24 boards, 12 ft. long, 12 in. wide and 2 in. thick?
- (7) 1 plank, 12 ft. long, 8 in. wide and $1\frac{1}{2}$ in. thick?
- (8) 2 planks, 14 ft. long, 9 in. wide and 2 in. thick?
- (9) 20 planks, $8\frac{1}{2}$ ft. long, 16 in. wide and 3 in. thick?
- (10) 13 planks, 16 ft. long, 13 in. wide and 2 in. thick?
- (11) 1 scantling, 12 ft. long, 3 in. wide and 2 in. thick?
- (12) 6 scantling, 14 ft. long, 4 in. wide and 3 in. thick?
- (13) 20 scantling, 16 ft. long, 5 in. wide and 4 in. thick?
- (14) 48 scantling, 18 ft. long, 6 in. wide and 4 in. thick?

B.

- (1) How many board feet of lumber in a floor 18 ft. long, 14 ft. wide and 1 inch thick?

- (2) How many feet of lumber in a sidewalk 200 yds. long, 6 ft. wide and $1\frac{1}{2}$ in. thick?
- (3) How many feet of lumber in a stick of timber 21 ft. long and 20 in. square?
- (4) How many feet of inch lumber in a board fence 30 rods long, 6 ft. high?
- (5) A bridge 144 yds. long and 18 ft. wide is covered with plank 3 in. thick. How many board feet of plank?
- (6) How many board feet will be required to make a walk 3 ft. wide around a garden 300 yds. long and 240 yds. wide?
- (7) Find the cost of the lumber for a platform 250 ft. long, 75 ft. wide and 2 in. thick at \$12 per thousand.
- (8) How many feet long will a plank 10 in. wide and 3 in. thick require to be to contain 45 ft. board measure?
- (9) What length of 2 in. plank, 16 in. wide, will contain 64 ft. board measure?
- (10) How many feet of 2 in. plank will be required for 2 miles 80 rods of sidewalk, 6 ft. 6 in. wide?
- (11) Find the value of the plank for a sidewalk 100 yds. long, 6 ft. wide and 2 in. thick, at \$20 per thousand.
- (12) Find the total cost of 8 boards, each 11 in. wide; 7 boards 9 in. wide and 6 boards 8 in. wide, at \$10.50 per M.; all the boards are 14 ft. in length.

Exercise XVI.—GENERAL TABLES.

- (1) How many articles in 19 dozen; in 17 score; in 3 score and ten?
- (2) How many units in 1 gross; in 3 gross, 7 dozen?
- (3) Find the cost of 120 gross of spools at 40 cents a dozen.
- (4) Find the price of 1120 stone of flour at \$3 per cwt.
- (5) What is the cost of 14 dozen brooms at $18\frac{1}{2}$ cents each.
- (6) If a quire of paper costs 16 cents. What is the cost of 5 reams?
- (7) How many score of sheep in 5 flocks, each containing 160 sheep?

(8) If a box of pens be bought for 80 cents and the pens sold for a cent each, find the gain on 2 dozen boxes, (1 box contains 1 gross).

(9) How many buttons can be purchased for \$6 at 25 cents a dozen?

(10) In 10512 pens how many boxes?

(11) A woman sold 2472 eggs at 9 cents a dozen, and bought cloth with the money at 27 cents a yard. How many yards did she buy?

Exercise XVII.—STERLING MONEY.

(1) Write the table.

(2) How many pence in 8 shillings; in 12 shillings; in £1; in 1 guinea?

(3) Express 96134 pence in pounds, etc.

(4) In 768 guineas how many pence?

(5) How many cents in 3 shillings; in 12 shillings; in 2 guineas? (Taking 24 cents to a shilling).

(6) How many dollars and cents in £6; in £9; in £3 10s.? (£1 = \$4.86 $\frac{2}{3}$).

(7) How many guineas in £42; in £147?

(8) Reduce £13 4s. 8d. to farthings.

(9) Find the difference in pence between £109 and 89 guineas.

(10) Reduce 76841 half pence to £, etc.

(11) How many pounds, etc., in 3927 three penny pieces?

(12) Reduce £13 19s. 7d. to half pence.

(13) How many shillings are there in £7 15s.; 2 guineas; 3 sovereigns; 4 crowns; and 2 six-pences?

(14) If £1 = \$4.86, how much is £2 10s. equal to in our money?

(15) How many pence in £63 9d.?

(16) How much will the Bank of Toronto charge to discharge a debt of £159 in Liverpool at \$4.88 per £.?

Exercise XVIII.—ARTICLES SOLD BY THE 100.**A.**

Find the value of:

- (1) 7250 lath at 30 cents per hundred.
- (2) 2900 pine apples at \$13 per c.
- (3) 2425 lbs. sugar at \$3 per cwt.
- (4) 8175 lbs. cheese at \$16 per cwt.
- (5) 275 lbs. of beef at \$6 per cwt.
- (6) 2160 lbs. of pork at \$8 per cwt.
- (7) 15 bbls. flour at \$2.50 per cwt.
- (8) 47800 bricks at \$8 per thousand.
- (9) 47200 shingles at \$3.50 per M.
- (10) 4320 feet of plank at \$40 per M.
- (11) 20750 ft. of lumber at \$16 per M.
- (12) 25500 shingles at \$4.50 per M.

B:

- (1) 3500 lbs. of hay at \$18 per ton.
- (2) 25360 ft. of lumber at \$27.50 per M.
- (3) 8400 lbs. of hay at \$9 per ton.
- (4) 8 tons, 1000 lbs. coal at \$5 per ton.
- (5) 6325 bricks at \$8 a thousand.
- (6) 20 planks each 12 ft. long, 12 in. wide and 3 in. thick, at \$12 per M.
- (7) Find the cost of 17640 feet of lumber at \$11.50 per M., and 3680 lbs. of coal at \$5.50 per ton.
- (8) How much would it cost to shingle a roof 40 feet long, each side being 15 feet wide at \$2.65 per M. (1000 shingles cover 10 ft. square)?
- (9) How many shingles will cover the two sides of a roof, each side of which is 27' by 14' 6"?
- (10) Find the total cost of 8640 lbs. of coal at \$6.25 a ton, 17860 feet of lumber at \$13.50 a thousand.

C.

- (1) Find the cost of 4444 lbs. of hay at \$8.50 a ton.

HE 100.

(2) A field is 330 yards long and 220 yards wide. Find the cost of the lumber for a close board fence 6 ft. high, at \$15 per M.

(3) Find the cost of inch flooring at \$17.50 per thousand for a floor 28 ft. by 16 ft.

(4) A dealer purchased 4250 lbs. of hay at \$10 per ton, and sold it at 68 cents per cwt. ; find his gain.

(5) Find the cost of 2700 pine apples at \$12 $\frac{1}{2}$ per C.

(6) At \$12 per thousand, how much will the lumber cost for a close board fence 80 rods long and 6 ft. high?

(7) How much will it cost to lay the floor of a room 16' x 14' at \$1.25 a square (a square = 100 square feet)?

(8) How much would it cost to lay a floor 7 yards long by 5 yards wide, at \$1.33 $\frac{1}{3}$ a square?

(9) How many bunches of shingles will be required to cover a roof 50' x 24', if it takes 4 bunches to the square?

(10) How much will it cost to shingle a roof, the length of the rafters on each side being 15 ft. and the building 35 ft. long ; the bunches costing \$1.16 each?

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\$6.25 a

ton-

COMPOUND RULES.

Exercise XIX.—ADDITION.

A.

(1)
\$987.63
429.92
38.34
927.74
9.00

(2)
\$ 96.24
198.78
647.92
68.34
928.87

(3)
\$719.43
921.99
86.86
50.00
9.37

(4)
\$9836.74
968.10
91.98
7.54
.87

(5)
yds. ft. in.
23 2 7
34 1 6
52 1 11
74 2 7
61 2 9

(6)
miles. yds.
18 897
73 936
196 1042
584 1197
762 1264

(7)
miles. chains. yds.
6 40 11
7 29 19
8 37 8
7 16 5
3 74 21

(8)
miles. rods.
6197 50
8193 47
604 123
897 235
68 39

(9)
miles. chains. rods.
16 13 2
12 22 3
17 15 3
26 73 2
59 68 2

(28)

COMPOUND ADDITION

29

(10)			(11)			(12)		
miles.	yds.	ft. in.	sq. yds.	sq. ft.	sq. in.	sq. mls.	acres.	sq. rods.
17	94	2 11	56	4	76	817	89	138
817	215	2 7	48	5	23	76	104	147
918	832	1 8	20	8	15	934	216	25
69	912	1 9	39	6	38	518	317	16
8	1013	1 6	14	7	96	72	94	118

(13)			(14)			(15)		
sq. miles.	acres.	sq. yds.	acres.	sq. rods.		acres.	sq. ch.	ins.
87	39	193	186	89		114	8	
92	217	763	175	76		96	5	
31	318	1082	123	94		123	7	
986	169	2162	100	123		64	9	
14	4	894	98	119		257	3	

B.

(1)			(2)			(3)			
tons.	cwt.	lbs.	tons.	lbs.	oz.	lbs.	oz.	dwt.	gra.
18	7	37	719	187	4	18	5	9	11
17	18	45	816	913	11	17	7	17	13
9	12	53	43	486	7	29	4	6	21
8	16	61	219	1732	9	26	6	14	6
26	18	77	8	58	8	38	11	3	8

(4)			(5)			(6)		
£	s.	d.	£	s.	d.	£	s.	d.
27	16	3	147	6	8½	987	15	4½
81	17	9	86	13	9½	764	17	7¼
93	9	4	72	15	7	99	9	9½
67	9	5	474	9	7¼	87	11	11¼
72	14	7	79	9	8¾	986	13	10½

(7)

wks.	days	hrs.	min.	sec.
8	1	9	32	27
9	2	11	36	31
19	4	17	40	35
17	3	19	44	39
26	5	21	48	43

(8)

hrs.	days	hrs.	min.	sec.
98	217	12	47	28
87	221	16	51	36
76	318	18	55	42
35	247	24	49	48
42	108	29	43	34

(9)

tons	cwt.	qrs.	lbs.	oz.	drs.
14	12	1	13	5	9
23	13	1	15	7	8
37	17	3	9	9	6
45	19	2	17	6	7
68	8	2	16	8	4

(10)

bus.	pks.	gals.	qts.	pt.
897	1	1	2	1
26	3	1	2	0
3	2	0	3	1
41	1	1	3	1
768	2	1	2	0

(11)

great	gross	doz.	units.
15	7	5	6
13	8	6	7
29	9	4	8
76	5	9	10
13	4	7	11

(12)

thous'd.	hund'd.	tens.	units.
6	5	4	3
9	8	7	5
5	4	8	6
2	6	9	7
1	7	5	4

C.

(1) A merchant in Toronto sells goods to the following amounts during the week: Mon., \$417.96; Tues., \$738.46; Wed., \$608.32; Thurs., \$976.50; Fri., \$1087.63; and Sat., \$2109.75. Required the amount of the week's sales.

(2) My last month's expenditure was as follows: Baker's bill, \$3.16; Butcher's bill, \$26.85; groceries, \$13.18; fruit, \$3.68; and sundries, \$29.68. How much did the whole come to?

(3) A farmer sold 6 loads of wheat, the first containing 1819 lbs., the second 2037 lbs., the third 2036 lbs., the fourth 1926 lbs., the fifth 1673 lbs., and the sixth 2162 lbs. How many bushels did the six loads contain?

(4) A merchant sold the following quantities of molasses: on Feb. 1st, 15 gal. 3 qts. 1 pt.; on Feb. 2nd, 23 gal. 2 qts. 1 pt.; on Feb. 3rd, 31 gal. 3 qts.; on Feb. 4th, 9 gal. 1 pt. How much did he sell in the four days?

(5) A grocer sends off the following quantities of butter: 47 cwt. 56 lbs.; 83 cwt. 86 lbs.; 26 cwt. 34 lbs. How many tons did he send off?

(6) A man has owing to him the following sums: £13 10s. 7d.; £46 5s. 8½d.; and £49 19s. 5½d. How much is owing altogether?

(7) A jeweller receives on Mon., 16 lb. 4 oz. gold; on Tues., 9 lbs. 5 oz. 18 grs.; on Wed., 6 lbs. 15 dwt. 20 grs.; on Thur., 5 oz. 10 dwt.; on Fri., 13 lbs. 3 oz. 16 dwt. 16 grs. How much does he receive in all?

(8) Three fields have an area respectively of 17 acres 139 sq. rd.; 16 acres 76 sq. rd. 25 sq. yd.; and 9 acres 125 sq. rd. 18 sq. yd. What is the total area?

(9) What is the entire length of a railway consisting of 4 different lines, measuring respectively 189 miles 176 rd. 2 yd.; 85 miles 60 rd. 4 yd.; 100 miles 224 rd. 3 yd.; and 59 miles 174 rd. 4 yd.?

(10) Find the total quantity of wood in 4 piles containing respectively 20 cords 15 cub. ft.; 23 cords 59 cub. ft.; 16 cords 68 cub. ft.; and 29 cords 125 cub. ft.

Exercise XX.—SUBTRACTION.

A.		
(1)	(2)	(3)
\$8976.43	\$3427.63	\$1600.87
987.49	2197.21	384.93

ARITHMETIC

(4)

£	s.	d.
1089	12	7
423	15	9

(5)

£	s.	d.
784	14	8½
457	16	11¾

(6)

£	s.	d.
563	15	6¼
138	19	7½

(7)

cwt.	qrs.	lbs.
200	2	20
99	3	21

(8)

miles	yards
8943	67
4817	943

(9)

miles	rods
1376	21
987	237

(10)

tons	cwt.	lbs.	oz.
714	13	37	11
286	17	49	13

(11)

lbs.	oz.	dwt.	grs.
576	9	19	4
89	10	16	15

(12)

hrs.	da.	hr.	min.	sec.
4083	200	10	30	15
2186	319	19	39	34

B.

(1)

ac.	sq. rd.
197	57
103	96

(2)

ac.	sq. yd.
283	1239
118	3674

(3)

cords	cub. ft.
893	76
275	127

(4)

miles	rd.	yd.	ft.	in.
768	29	5	2	5
94	138	3	2	7

(5)

ac.	sq. rd.	sq. yd.	sq. ft.	sq. in.
1301	31	29	3	23
423	38	13	8	76

(6)

bus.	pk.	gal.	qt.	pt.
710	2	0	2	0
186	3	1	3	1

(7)

tons	cwt.	qrs.	lbs.	oz.	drs.
716	13	2	16	2	7
176	16	3	20	9	8

(8)				(9)			
great	gross	doz.	units	thousand	hund.	tens	units
576	3	4	5	76	4	7	8
289	10	9	8	17	5	8	9

C.

(1) A merchant has 219 casks of butter, weighing 397 cwt., 64 lbs. He ships off 173 casks, weighing 214 cwt., 76 lbs. How many casks has he left, and what is their weight?

(2) A farm contains 769 acres, 2 roods, 20 rods, of which 473 acres, 2 roods, 23 rods are under cultivation. How much remains untilled?

(3) A merchant has \$5947.87 in the bank; \$3789.63 in stock; \$9419.15 in property; \$2684.39 on his books against his customers. His debts amount to \$8762.49. How much is he worth?

(4) How much must be added to 6 tons, 1419 lbs., to make 10 tons?

(5) I started for a walk 3 hours, 37 minutes, 29 seconds after noon, and returned at 9 p.m. How long was I away?

(6) From 15 years, 3 days, 16 hours, 29 minutes, 6 seconds, take 9 years, 1 week, 3 days, 22 hours, 50 minutes, 40 seconds.

(7) A wagon loaded with hay weighs 34 cwt., 72 lbs.; the wagon alone weighs 9 cwt., 96 lbs. Find weight of the hay.

(8) A barrel holds 31 gals.; there was poured into it 14 gals., 1 pt. of vinegar at one time, and 3 gals., 1 qt. at another. The barrel was then filled with water. How much water was poured in?

(9) A farmer had 1000 bush. of wheat. He sold 249 bush., 1 peck at one time, 448 bush., 3 pecks, 1 gal. at another, and kept the rest for flour and seed. How much did he keep?

(10) A man travels 8 miles, 216 rods by railway and 17689 yards by boat. Which way does he travel the farther, and how much?

(11) Out of a stack of hay containing 16 tons 9 cwt. 37 lbs., three loads were sold, containing respectively 3 tons 4 cwt. ; 2 tons 19 cwt. 59 lbs. ; and 3 tons 13 cwt. 14 lbs. How much is left in the stock?

(12) A man owns three farms, the first has 75 acres 3 sq. rds. 17 sq. yds. ; the second 27 acres 1 sq. rd. 19 sq. yds. ; and the third as much as the other two, less 4 acres 3 sq. rds. 29 sq. yds. How much land is in the third farm?

Exercise XXI.—MULTIPLICATION.

A.

- (1) Multiply \$573.52 by 49.
- (2) " 13 cwt. 5 lbs. 6 oz. by 12.
- (3) " 13 bus. 3 pk. 1 gal. 2 qt. 1 pt. by 57.
- (4) " 5 tons 12 cwt. 23 lbs. 4 oz. 6 drs. by 37.
- (5) " £23 7s. 6½d. by 6.
- (6) " £49 11s. 8¾d. by 8.
- (7) " 6 days 15 hrs. 32 min. 17 sec. by 374.
- (8) " 23 miles 176 rds. 4 yds. by 22.
- (9) " 18 acres 29 sq. rds. by 914.
- (10) " 10 lbs. 3 oz. 15 dwt. 17 grs. by 19.
- (11) " 12 miles 560 yds. by 23.
- (12) " 17 miles 83 yds. 2 ft. 11 in. by 63, using factors.

B.

- (1) Multiply 109 acres 3179 sq. yds. by 12.
- (2) Multiply 8 thousand 7 hundred 9 tens 7 units by 9.
- (3) Find the length of fence enclosing a square field 30 rods 4 yd. 2 ft. 7 in. long.
- (4) The G. W. Ry. is 229 miles in length, and its average cost per mile is \$61135.37. Find the cost of the road.
- (5) What is the value of 6 loads of wheat, each containing 32 bushels 3 pecks, at 86 cents a bushel?
- (6) Find the value of 14 bushels 6 gallons of peas at 15 cents the peck.

- (7) Find the total cost of 13 bush., 16 lbs. barley at 45 cents a bush.; 56 bush., 45 lbs. wheat at 96 cents a bush., and 10 bush., 17 lbs. oats at 40 cents a bush.
- (8) Find the value of 7683 lbs. of cheese at \$12 per cwt.
- (9) Find the cost of 3157 lbs. buckwheat at 72 cents a bushel.
- (10) If 1 silver spoon weigh 3 oz., 8 dwt., 13 grs., what is the weight of 8 dozen such spoons?
- (11) A man travels 24 miles, 6 furlongs, 3 rods in a day. How far could he travel in 2 weeks?

C.

- (1) Find the total length in rods of 48 pieces of wire, each piece being 35 yds., 2 ft., 3 in. long.
- (2) A wagon wheel 15 ft., 10 in. in circumference makes 1634 revolutions in an hour. How far in miles, yards, etc., does the wagon go in 5 hours?
- (3) A boy walks 1 mile, 45 yards to school each morning, and the same distance home each afternoon, for 208 days in the year? How far does he walk during that time?
- (4) A farmer plowed 1 acre, 160 sq. rods a day for 23 days. How much did he plow?
- (5) What is the length of 3000 rails, each 16 ft. 8 in. long?
- (6) The fore quarters of a lamb weighed 6 lbs. 2 oz. each, and the hind quarters 8 lbs. 5 oz. each. How much did the lamb weigh?
- (7) A hall is 35 ft. 11 in. long and 7 ft. 9 in. wide. What is the length around it?
- (8) How much coal oil is contained in 29 bbls., each containing 29 gals., 3 qts., 1 pt.?
- (9) Multiply 89 miles, 119 rods, 4 yds., 1 ft., 8 in. by 7.
- (10) A clock gains 3 min., 15 sec. per day. How much will it gain in a fortnight?

Exercise XXII.—DIVISION, DIVISOR ABSTRACT.

A.

- (1) 27 lbs. 12 oz. $\div 3$.
- (2) 39 lbs. 5 oz. $\div 4$.
- (3) \$7624.53 $\div 9$.
- (4) \$1713 $\div 4$.
- (5) 30 gal. 3 qt. 1 pt. $\div 7$.
- (6) 68 bus. 2 pk. 1 gal. 2 qt. $\div 8$.
- (7) 31 days 5 hrs. 15 min. 10 sec. $\div 12$.
- (8) 84 yds. 2 ft. 9 in. $\div 5$.
- (9) 13 miles 945 yds. 2 ft. 6 in. $\div 3$.
- (10) £157 15s. 8d. $\div 13$.
- (11) 73219 tons 15 cwt. 89 lbs. 6 oz. $\div 427$.
- (12) 2870 weeks 4 days 19 hours 29 minutes 30 seconds $\div 193$.
- (13) 287 acres 469 sq. yds. $\div 3$.
- (14) 47 thousand, 8 hundred, 7 tens, 3 units $\div 8$.
- (15) 5 million, 3 ten-thousands, 6 thousand, 5 hundred, 9 tens, 8 units $\div 79$.

B.

- (1) A farm of 250 acres is surveyed off as a village site, one-eighth of the whole is laid out as streets, and the remainder is divided into 500 lots of equal size. What is the size of each lot?
- (2) The Rideau Canal is 126 miles long, and cost \$3860010. What was the average cost per mile?
- (3) Divide a legacy of \$10000 equally among 279 persons.
- (4) 65 bus. 3 pk. 2 qt. of wheat is contained in a dozen sacks. What does each sack hold?
- (5) If 13 men can mow 27 acres 150 sq. rds. of grass in a day, how much can one man mow?
- (6) A speculator bought 12 adjoining pieces of land, each containing 4 acres 80 sq. rds. He divided the whole into 108 lots, and sold them at \$5 a sq. rod. How much did he get for each lot?

(7) If 7 gross of buttons cost £2 16s., now much will 15 gross cost?

(8) Seven horses eat 15 bus. 2 pk. 3 qt. of oats in a week. How much is that for each horse?

(9) A father who had a 200 acre farm, gave his only son 80 acres, 100 sq. rods, and divided the remainder equally among his seven daughters. Find to a square inch a daughter's share.

(10) A owns a farm of 25 acres, 19 sq. rods, 7 sq. yds.; B owns a farm one-fourth the size of A's; C's farm is 9 acres, 18 sq. yds., 7 sq. ft. less than 9 times as much as B's. Find the amount of land in the three farms.

(11) A man had 244 acres, 124 sq. rods, 28 sq. yds., 7 sq. ft. of land. He kept 85 acres, 137 sq. rods, 29 sq. yds., 6 sq. ft., and divided the rest among his 4 sons. How much did each get?

Exercise XXIII.—DIVISOR CONCRETE.

A.

- (1) $\$43.50 \div \$8.70$.
- (2) $\$2002 \div 13$ cents.
- (3) $\$4440 \div \$3.70$.
- (4) 15 lbs. 10 oz. $\div$ 3 lbs. 2 oz.
- (5) 4 days, 4 hrs. $\div$ 50 min.
- (6) 9702 gal. $\div$ 31 gal. 2 qt.
- (7) 1 mile $\div$ 2 ft. 6 in.
- (8) 16 yds. 4 in. $\div$ 4 ft. 10 in.
- (9) 50 miles, 200 yds. $\div$ 2 yds., 1 ft. 6 in.
- (10) 68 tons, 1594 lbs. 10 oz. $\div$ 152 lbs. 6 oz.
- (11) 20 lbs. 8 oz. $\div$ 12 oz.
- (12) 26 weeks, 1 day $\div$ 3 hrs., 50 min.

B.

- (1) How often is 2 acres, 27 sq. rods contained in 36 acres, 139 sq. rods?
- (2) How many sleepers 2 ft. 6 in. apart will be required for a railway 281 miles, 180 rods long?

- (3) How long will it take to plow 147 acres, 105 sq. rods at the rate of 4 acres, 35 sq. rods a day?
- (4) How many turns will a wheel 14 ft. 3 in. in circumference make in rolling a distance of 19 miles?
- (5) How many barrels, each containing 1 bush., 3 pecks, 6 quarts, will a farmer require to pack 124 bushels for market?
- (6) How many chains each 66 ft. long will measure 2 miles 80 rods?
- (7) How many pint bottles can be filled from a hogsh-head holding 2 barrels of $31\frac{1}{2}$ gal. each?
- (8) How many hogsheads of sugar, each containing 13 cwt. 2 qrs. 14 lbs. may be put on board a ship of 341 tons burden?
- (9) How often will a bicycle wheel 7 ft. 6 in. in circumference rotate in going $3\frac{3}{4}$ miles?
- (10) A tract of land is 1220 chains long and 80 rods wide; what is it worth at \$50 an acre?
- (11) Divide 4 years 2 months 10 days reckoning from the first day of 1893 into periods of 7 days 2 hours each.
- (12) Assuming that a person's step is 2 ft. 6 in., how many steps does he take in walking 3 miles 720 yds.?

C.

- (1) A wagon-box is $12 \times 4 \times 2$ ft.; how many bricks $9 \times 4 \times 2$ in. will it contain?
- (2) How many bushels of wheat would it take to fill a bin $8 \times 4 \times 3$ ft., if a cubic foot contains 25 quarts?
- (3) A man can run 100 yards in 10 seconds. How many miles will a steamboat go in $5\frac{1}{2}$ days at the same rate?
- (4) A cask contains 64 gal. 3 qt. 1 pt., how many times may a vessel holding 1 qt. 1 pt. be filled from the cask?
- (5) The fore-wheel of a carriage, which is 7 feet in circumference, makes 440 revolutions more than the hind wheel in going 1 mile 240 rods. Find the circumference of the hind wheel?
- (6) How many loads of potatoes, each containing 15 bushels, at 42 cents a bushel, will pay for 12 rolls of carpeting, each containing 56 yards at $7\frac{1}{2}$ cents a yard?

(7) Find the number of bushels of wheat in a bin 6 ft. by 8 ft. and 4 ft. deep, if 1 gal. is equal to about 277 cubic inches.

(8) If a field 50 rods long contains 10 acres, how wide is the field?

(9) How many pieces of wire 3 ft. 5 in. can be cut off a roll 40 rods long?

(10) I have built 102 rods of wire fence 6 wires high. One pound of the wire is 17 feet long. Find the value of the wire at 3 cents a lb.

(11) How many bushels of oats are equal in weight to 68 bushels of barley and 51 bushels of wheat?

(12) Find the value of a bin of wheat 6' long, 4' wide and 3' 6" deep, at 72 cents per bushel (1 cubic ft. = 25 quarts).

MISCELLANEOUS.

Exercise XXIV.—AVERAGES.

A.

(1) What is the mean between 10 and 80; between 0 and 90; between 76 and 182?

(2) What is the average of three lengths of 5 ft., 6 ft., 7 ft.?

(3) What is the average of five weights of 8 lbs., 12 lbs., 15 lbs., 18 lbs., 22 lbs.?

(4) What is the average of four loads of wheat of 40 bush., 45 bush., 50 bush., 55 bush.?

(5) What is the average of the following scores at a rifle match: 72, 73, 79, 80, 83, 87?

(6) The aggregate weight of 12 men was 1896 lbs. Find their average weight.

(7) A grocer's daily receipts were: Monday, \$200; Tuesday, \$180.50; Wednesday, \$214.75; Thursday, \$325; Friday, \$240.10; Saturday, \$416.27. Find the average daily receipts for the week.

(8) A man walked 373 yds. 1 ft. in 480 steps. What was the average length of his steps?

(9) I bought 5 cattle for \$72; 2 at \$17 each; 2 at \$23 each; 2 at \$20 each; 1 for \$16, and 1 for \$22. I sold them all for \$347. Find my average gain.

(10) The average age of A, B, C, D, E and F is 31 years. The average age of A, B, C, D and F is 28 years. Find the age of F.

B.

(1) 23 cows and 16 horses together cost \$2566. The cows cost \$26 each. Find the average cost of each horse.

(2) Find the average cost per lb. of the following: 32 lbs. of tea at 46 cents a lb.; 28 lbs. at 25 cents; 24 lbs. at 30 cents, and 18 lbs. at 15 cents.

(3) What is the average cost per lb. of the following: 32 lbs. @ 50c.; 25 lbs. @ 26c.; 23 lbs. @ 31c., and 17 lbs. @ 14c.?

(4) A grocer mixes together 9 lbs. tea worth 32 cents a lb., 12 lbs. worth 41c., and 15 lbs. worth 56c. Find the value of 1 lb. of the mixture.

(5) A grocer mixes 15 lbs. of coffee @ 27c., 3 lbs. @ 35c., and 3 lbs. @ 40c. What are two and a-half pounds of the mixture worth?

(6) What is the average acreage of three farms, the first containing 100 acres; the second measuring 200 rods long and 36 rods wide; and the third measuring 20 rods wider than the second, but only half the length?

(7) The average weight of 4 horses was 1287 pounds; the first horse weighed 10 lbs. more than the second, but 16 lbs. less than the third, which weighed 2 lbs. less than the fourth. Find the weight of each.

(8) Find the average price per lb. of the following :
 15 lbs. @ 15c.; 16 lbs. @ 14c.; 18 lbs. @ 11c., and 13 lbs.
 @ 17c.

Exercise XXV.—APPLICATION OF SQUARE MEASURE.

A.

(1) Find the area in square yards of the following square fields, whose sides respectively are : 15 yds., 24 yds., 37 yds., 59 yds.

(2) Find the area in sq. yds. and sq. ft. of the following square fields, whose sides respectively are : 9 yds. 2 ft.; 12 yds. 1 ft.; 17 yds. 1 ft.; 25 yds. 2 ft.

(3) Find the area in sq. yds., sq. ft., sq. in. of the following square fields, whose sides respectively are : 4 yds. 2 ft. 5 in.; 7 yds. 2 ft. 8 in.; 9 yds. 1 ft. 9 in.; 15 yds. 2 ft. 10 in.

(4) Find the area in sq. ft. of rectangular fields having respectively the following dimensions in feet : 24 by 20; 27 by 18; 33 by 27; and 112 by 97.

(5) Find the area in sq. yds. and sq. ft. of the following rectangular fields : 5 yds. 2 ft. by 7 yds.; 3 yds. 1 ft. by 10 yds. 2 ft.; 13 yds. 2 ft. by 12 yds. 1 ft.; and 26 yds. 2 ft. by 24 yds. 2 ft.

(6) Find the area in sq. yds., sq. ft., and sq. in., of the following rectangular fields : 2 yds. 1 ft. by 4 yds. 1 ft. 3 in.; 5 yds. 1 ft. 4 in. by 5 yds. 2 ft.; 6 yds. 2 ft. 8 in. by 3 yds. 2 ft. 10 in.

(7) A plank is 18 in. broad, find what length must be cut off to make a square yard.

(8) What part of an acre is a field 120 yards long and 25 yards wide?

(9) A street is a quarter of a mile long; find the number of square yards in the pavements 3 feet wide on both sides.

(10) Each window of a house is 4 ft. 2 in. by 2 ft. 5 in., find the number of panes of glass in each, a pane measuring 11 inches by 8 inches.

(11) How many sods each 16 in. by 12 in. will be required for a plot of ground 24 ft. by 18 ft.?

(12) Find how many bricks measuring 9 in. by 4 in., will be required to cover a space 18 ft. by 12 ft. 8 in.

B.

(1) Find how many planks 12 ft. long by 9 in. wide will be required to floor a room 24 ft. by 18 ft.

(2) Find how many persons can stand in a room measuring 18 ft. by 15 ft., supposing each person to require a space of 27 in. by 18 in.

(3) Find how many trees there are in a wood half a mile long and a quarter of a mile wide, supposing on an average four trees grow on each square chain.

(4) The side of a square is 84 yards, and a path 2 yds. wide goes round the square on the outside. Find how many stones 1 ft. 4 in. long by 9 in. wide will be required to pave the path.

(5) How many rails 11 ft. long would be required to enclose a rectangular field 30 rods by 48 rods, with a straight fence 5 rails high?

(6) Find the rent at \$3 an acre of a piece of land 4235 yds. long and 280 yds. wide.

(7) A rectangular court measures 18 ft. 6 in. by 12 ft. 3 in.; find the expense of paving it at 8 cents per square foot.

(8) Find the cost of the wire at 6 cents for $5\frac{1}{4}$ yards, for a barbed-wire fence six wires high, to enclose a rectangular field 36 rods by 45 rods.

(9) The ceiling of a room is 20 ft. by 15 ft., find the length in inches around the walls.

(10) At a cent and a half a square yard, how much will it cost to sod a lawn half a mile long and 63 feet wide?

Exercise XXVI.—CARPETING.**A.**

Find how many yards of carpet running lengthwise will be required for rooms of the following dimensions :

- (1) 18 ft. by 15 ft., carpet a yard wide.
- (2) 25 ft. by 18 ft., carpet a yard wide.
- (3) 18 ft. by 12 ft., carpet 27 in. wide.
- (4) 21 ft. by 9 ft. 11 in., carpet 27 in. wide.

Find the expense of carpeting the following four rooms, the dimensions and cost being :

- (5) 24 ft. by 21 ft., carpet a yard wide and 90 cents a yard.
- (6) 30 ft. by 15 ft., carpet a yard wide and \$1.20 a yard.

- (7) 18 ft. 6 in., by 13 ft. 6 in., carpet 27 in. wide and 75 cents a yard.

- (8) 43 ft. 4 in. by 24 ft. 9 in., carpet 27 in. wide and 99 cents a yard.

- (9) How many yards of stair carpet will be required for a straight stair of 21 steps, 11 in. wide and 7 in. high, allowing for 2 extra yards?

- (10) How many yards of carpeting 27 in. wide will be required for a room 17 ft. 4 in. by 14 ft. 5 in., if the strips run lengthwise of the room, and 8 in. per strip be wasted in matching?

- (11) How many yards of carpeting, 1 yard wide, will be required for a room 30 ft. by 16 ft. 10 in., if the strips run lengthwise of the room, and 9 in. per strip be wasted in matching?

- (12) Find the cost of carpet for a room 22 ft. 7 in. by 14 ft., if the carpet be 27 in. wide and cost \$1.20 a yard, and 6 in. per strip be wasted in matching, the strips running crosswise of the room.

B.

- (1) How many yards of thick paper, 30 in. wide, will cover a floor 20 ft. long and 18 ft. wide?

- (2) How many yards of stair carpet will be required for a flight of stairs of 16 steps, 12 in. wide and 5 in. rise, allowing 1 ft. 4 inches for a turn in the stairs?
- (3) What will it cost to carpet a room 24 ft. long and 16 ft. wide with carpet 32 in. wide and costing 80 cents a yard, the carpet running lengthwise of the room?
- (4) Find the cost of carpeting, with carpet at 85 cents a square yard, a room 33 ft. by 21 ft.
- (5) Find the cost of carpeting a room 18 ft. long and 16 ft. 6 in. wide with carpet 27 in. wide, at 96 cents a yard, the carpet being cut into strips 16 ft. 6 in. long.
- (6) What will it cost to carpet a room 25' 6" long and 14' 5" wide with carpet 27 in. wide and costing \$1.44 a yard; first carpet laid crosswise, second lengthwise?
- (7) How many yards of carpet will be required for a hall 18 ft. long and 11 ft. wide, the carpet being 27 in. wide and running lengthwise? How much would it cost at 87½ cents a yard?
- (8) Which will cost more, to use, lengthwise, carpet 32 in. wide at 96 cents a yard, or carpet a yard wide at \$1 a yard, for a room 18 ft. by 15 ft., and how much more?
- (9) How long must a strip of carpet 27 in. wide be, to contain 24 sq. yds., and find its cost at 89c. a yd.?
- (10) A room 17' × 13' is to be carpeted with carpet 27 in. wide and costing 87 cents a yard. Which is the cheaper, and how much, to lay the carpet lengthwise or crosswise of the room, no allowance for matching?
- (11) A room 15' 8" × 14' 8" is to be carpeted with carpet a yard wide and costing \$1.08 a yard. If 12" per strip be wasted in matching, which is the cheaper, to lay the carpet lengthwise or crosswise, and how much? How much is wasted in turning under and matching in each case?

Exercise XXVII.—PAPERING.

A.

The method on which this exercise is worked is as follows: The sum of the widths of doors and windows is

deducted from the perimeter of the room, and the number of strips is obtained by finding how often the remainder contains 18 inches (The width of Canadian and American paper). The length of a single roll of paper is 24 feet.

NOTE.—Paperhangers have a special rule: Deduct half the area of the openings (in square feet) from the area of the walls, and divide the remainder by 30. This gives the approximate number of rolls.

(1) How many widths of paper will be required for a room 18 ft. by 15 ft., no allowance for doors and windows?

(2) How many strips will go round a room 19 ft. by 24 ft.?

(3) How many strips are required for a room 31 ft. by 24 ft., if there are 4 windows and 2 doors each 3 ft. wide?

(4) How many rolls will be required for a room 21' 5" by 13' 4", with 2 doors and 2 windows each 3' wide?

(5) How many strips are required for a hall 26 ft. long and 6 ft. wide, papering the sides only, on which there are 4 doors, each 3 ft. 3 in. in width?

(6) How many rolls will paper a ceiling 24' x 18'?

(7) How many rolls of paper are required for the walls of a room 21 ft. long, 17 ft. wide and 9 ft. high?

(8) How many rolls will paper the walls of a room 12 ft. by 16 ft. and 8 ft. high, allowing for 1 door and 2 windows each 3 ft. 4 in. in width?

B.

(1) Find the cost of paper for the walls of a room 17 ft. by 13 ft. and 9 ft. high, with 3 openings, at 36 cents per double roll (each opening 2 ft. 11 in. wide).

(2) Find the cost of paper 21 in. wide for the walls of a room 35 ft. by 20 ft. to the height of $3\frac{1}{2}$ ft. at 65 cents per double roll; 1 foot on each strip is allowed for matchings, and the border costs 8 cents a yard.

(3) If the paper-hanger charges \$2.50, the border costing 8 cents a yard and the paper 15 cents per roll, find the cost of papering a room 22 ft. by 14 ft. and 12 ft. high, with paper 30 in. wide, allowing 12 ft. for doors and windows.

(4) Find the cost of the wallpaper 21 in. wide, at 25 cents a roll, required for a room 20 ft. 8 in. by 15 ft. 4 in. by 10 ft., with 2 doors each 3 ft. 8 in. wide and 3 windows each 4 ft. wide.

(5) Find the cost of the wall paper, 21 in. wide, at 20 cents a roll and bordering worth 10 cents a yard, for a room 27 ft. by 17 ft. and 12 ft. high, allowing for 2 doors each 4 ft. 3 in. wide, and 4 windows each 3 ft. 10 in. wide.

(6) If a double roll make only 4 strips, and 8 strips be deducted for doors and windows, find the total cost of papering a hall 30 ft. long and 8 ft. wide, with paper worth 62 cents a roll and bordering worth 12 cents a yard; the hanging of the paper costing 8 cents per roll, and putting on the border 1 cent a yard.

(7) What will it cost to paper the walls and ceiling of a room 27 ft. by 33 ft. and 18 ft. high, at 35 cents per square yard?

Exercise XXVIII.—PLASTERING AND PAINTING.

A.

NOTE.—It is customary in plastering or painting the walls of a room to deduct half the area of all openings, etc., and take for the required area the number of square yards nearest the remainder.

(1) Find the cost, at 20 cents per square yard, of plastering the walls and ceiling of a room 27 ft. long, 16 ft. wide and 10 ft. high, allowing for 2 doors, each 7 ft. by 3 ft., and 3 windows, each 6 ft. by 3 ft.

(2) Find the cost of plastering the walls and ceiling of a room $16 \times 12 \times 9$ feet, allowing for 2 doors, each 7 ft. by 3 ft. 6 in., and 2 windows, each 6 ft. by 4 ft., and a skirting board 1 ft. high, at 15 cents per square yard.

(3) How much will it cost to paint the ceiling of a church 120 ft. long, 70 ft. wide, at 15 cents a square yard?

(4) Find the total cost of painting the outside of a box, with lid, 4 ft. by 3 ft. by 4 ft. deep, at 18 cents per square yard.

(5) Find the cost, at 10 cents a square yard, of painting both sides of a close board fence 4 ft. high, round a rectangular lot 132 ft. by 66 ft., allowing \$3 for painting posts and scantlings.

(6) How much would it cost, at 20 cents per square yard, to paint the walls of a room 20 ft. by 17 ft. and 9 ft. high, deducting for 2 doors, each 7 ft. by 4 ft., and 3 windows, each 6 ft. by 3 ft., and also paint the ceiling at 30 cents per square yard?

(7) Find the cost of plastering the walls and ceiling of a room 24 ft. long, 18 ft. wide and 15 ft. high, the skirting board being 18 in. high, at 22 cents a square yard, three coats being put on the walls and two on the ceiling.

(8) Find the cost of painting the walls and ceiling of a room 26 ft. 6 in. long, 18 ft. wide and 14 ft. high, at 34 cents per square yard, allowing for 2 doors 7 ft. 6 in. by 4 ft., 2 windows 6 ft. by 4 ft., and 1 smaller window 3 ft. by 2 ft.

(9) What will it cost to paint the walls and ceiling of a room 18 ft. long, 15 ft. wide and 12 ft. high, at $2\frac{1}{2}$ cents a square foot?

(10) Find the cost of painting the walls and ceiling of a room 15 ft. 6 in. long, 14 ft. wide and 10 ft. high, at 36 cents per square yard, allowing 80 square feet for doors and windows.

(11) Find the cost, at 6 cents a sq. yd. of painting a fence 6 ft. high around a lot 22 rods square, both sides.

B.

(1) What will it cost to plaster a room 32 ft. long, 18 ft. wide and 13 ft. high, at 12 cents a square yard, allowing 200 square feet for doors and windows?

(2) Find the cost of painting the walls and ceiling of a room 18' 6" long, 14' wide and 10' high, at 23 cents per square yard, allowing for 2 doors 7' $\times$ 4', and 3 windows 6' $\times$ 3'.

- (3) Allowing for an 18-inch baseboard find the number of yards of plastering in a room $33 \times 27 \times 12$ ft.
- (4) Find the cost of plastering a wall 56 ft. long and 18 ft. high, at $21\frac{1}{2}$ cents per square yard.
- (5) Find the cost of plastering the walls and ceiling of a room 20 ft. long, 12 ft. wide and 9 ft. high, with four openings, each 8×4 ft., at 16 cents per square yard.
- (6) Find the cost of cementing the sides and bottom of a cistern 8 ft. by 12 ft. and 8 ft. high, at 9 cents per square foot.
- (7) How much white lead paint is required for one coat on a fence 187 yards long and 6 ft. high, if a pound covers $4\frac{1}{4}$ square yards?
- (8) What will it cost to paint a double roof 40 feet by 27 feet, at $12\frac{1}{2}$ cents a yard?
- (9) What will it cost to kalsomine a room 28 ft. by 16 ft. and $9\frac{1}{2}$ ft. high, at 7 cents a yard?
- (10) What will it cost to paint a close board fence 5 ft. high around a lot 45 yards by 35 yards, at 8 cents per square yard?

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MECHANICAL. WORK.

Exercise XXIX.—ADDITION.

(1)	(2)	(3)	(4)	(5)
76894	31467	82154	98621	73409
68317	28913	67418	94628	37645
34567	45678	56789	67891	78912
89123	91234	12345	23456	34567
45678	56789	67891	78912	89123
91234	12345	23456	34567	45678
56789	67891	78912	89123	91234
12345	23456	34567	45678	56789
67891	78912	89123	234	12345
23456	34567	45678	56789	67891
78912	89123	91234	12345	23456
34567	45678	56789	67891	78912
(6)	(7)	(8)	(9)	(10)
49867	76413	45128	12689	90437
71386	31982	81476	82649	54673
23456	34567	45678	56789	67891
78912	89123	91234	12345	23456
34567	45678	56789	67891	78912
89123	91234	12345	23456	34567
45678	56789	67891	78912	89123
91234	12345	23456	34567	45678
56789	67891	78912	89123	91234
12345	23456	34567	45678	56789
67891	78912	89123	91234	12345
23456	34567	45678	56789	67891
(49)				

Exercise XXX.—SUBTRACTION.

From each of the following subtract 444444 ten times in succession: (1) 5012331; (2) 4519063; (3) 4490612; (4) 4533599; (5) 4492123; (6) 4465913.

From each of the following subtract 555555 ten times in succession: (7) 5870278; (8) 6032441; (9) 6068767; (10) 5664169; (11) 5792654; (12) 6015369.

From each of the following subtract 666666 ten times in succession: (13) 7171451; (14) 7249857; (15) 7207272; (16) 7076173; (17) 7145622; (18) 7006738.

From each of the following subtract 777777 ten times in succession: (19) 8386686; (20) 8474893; (21) 8490115; (22) 8255787; (23) 8086686; (24) 8102918.

From each of the following subtract 888888 ten times in succession: (25) 9603297; (26) 9678492; (27) 9567792; (28) 9456771; (29) 9345669; (30) 9455983.

From each of the following subtract 999999 ten times in succession: (31) 10123446; (32) 10278908; (33) 10376794; (34) 10498607; (35) 10503071; (36) 10897889.

Exercise XXXI.—MULTIPLICATION.

Multiply each of the following numbers by 427: (1) 12288; (2) 13824; (3) 16384; (4) 18432; (5) 27648; (6) 24576; (7) 36864; (8) 49152; (9) 55296.

Multiply each of the following numbers by 568: (10) 12768; (11) 14364; (12) 17024; (13) 19152; (14) 25536; (15) 28728; (16) 38304; (17) 51072; (18) 57456.

Multiply each of the following by 9 ten consecutive times: (19) 12348; (20) 16464; (21) 24696; (22) 32928; (23) 49392.

Find the squares of each of the following: (24) 1404; (25) 1755; (26) 2808; (27) 3510; (28) 4212; (29) 7020; (30) 8424.

Exercise XXXII.—DIVISION.

Divide each of the following numbers by 284 : (1) 3626112 ; (2) 4079376 ; (3) 4834816 ; (4) 5439168 ; (5) 7252224 ; (6) 8158752 ; (7) 10878336 ; (8) 14504448 ; (9) 16317504.

Divide each of the following numbers by 9 ten consecutive times : (10) 21527406891774 ; (11) 28703209189032 ; (12) 43054813783548.

Divide each of the following numbers by 8 ten consecutive times : (13) 1457067655168 ; (14) 2914135310336 ; (15) 4371202965504.

Divide each of the following numbers by 7 ten consecutive times : (16) 1535535453564 ; (17) 2303303180346 ; (18) 767767726782 ; (19) 3454954770519 ; (20) 1151651590173.

Divide each of the following numbers by 6 ten consecutive times : (21) 5826157922304 ; (22) 8739236883456 ; (23) 3884105281536 ; (24) 971026320384 ; (25) 2913078961152.

Using factors, find the result of each of the following : (26) $8396741 \div 63$; (27) $893749847 \div 72$; (28) $8967459 \div 56$; (29) $9876402 \div 84$; (30) $45296787 \div 72$.

Exercise XXXIII.—GENERAL REVIEW PROBLEMS.

(1) Divide 84 miles, 240 rods, 2 yds. by 13, and reduce the quotient to inches.

(2) A man paid \$38.75 for cloth, 7 yds. costing \$10.85. How many yards did he buy?

(3) A boy counted the number of square inches in 4 times 1 acre, 49 rods, 3 yds., 7 ft., and his brother counted the number of ounces in 547 tons. Which boy counted the greater number, and how much greater?

+

(4) John and James started to walk from Toronto at noon, and walked until 20 min. after one o'clock. John walked east 3 miles 84 rods; James walked west 7920 yards. Which boy walked the faster, and how far apart were they at the end of the time?

(5) How long will it take a man walking at the rate of 4 miles an hour, to walk round a farm 120 chains long and 80 chains wide?

(6) At \$15 per M., find the cost of the 2-inch plank for a sidewalk a quarter of a mile long and 6 ft. wide.

(7) How many gallons of water are in a rectangular cistern 8 ft. long, 6 ft. wide, the water being 5 ft. deep?

(8) A wagon wheel 11 ft. in circumference makes 48 revolutions in a minute. How many miles an hour is the wagon going?

(9) Find the cost of carpeting a room 20 ft. 6 in. long and 17 ft. 8 in. wide, with carpet 27 in. wide, and costing \$1.25 a yard, if the strips run lengthwise and 6 in. of each strip be turned under for matching.

(10) Reduce 7 miles 4 rods to inches.

(11) What is the value of 1200 lbs. of hay at \$8 per ton?

(12) How many pickets, each 3 in. wide, placed 3 in. apart, will be required for 28 rods of fence?

(13) How many miles, etc., are there in 746859 inches?

(14) An oblong field is 30 rods long and 20 rods wide. What will it cost to put a fence around it at 15 cents a yard?

(15) How many bags each holding 2 bus. 1 pk. 4 qts., will contain 111 bus. 2 pk. 4 qts. of grain?

(16) A train passes a telegraph post every 15 seconds and the posts are 20 rods apart. How many miles an hour does the train go?

(17) How many minutes are there from 10.15 a.m. Monday to 6.30 p.m. Wednesday?

(18) If it cost \$1.75 to make 20 feet of road. What will be the cost of making a mile?

(19) Find the difference in square inches between 23 square rods, and one million and ten square inches. +

(20) How often can 2 gal. 1 qt. be subtracted from 36 bus. 3 pks.?

(21) A man travelled 32 miles 217 rds. 4 yds. 2 ft. on Monday, and 43 miles 276 rds. 5 yds. 2 ft. on Tuesday. How far would he have to go on Wednesday to go 100 miles altogether?

(22) A man paid for a piece of land 32 rds. wide by giving 240 cords of wood at \$4 a cord. Land being worth \$40 an acre, find the length of the piece of land.

(23) Find the cost of carpeting a room 30 ft. 6 in. long by 18 ft. 6 in. wide, with carpet 27 in. wide, at \$1.17 a yard, allowing 6 in. for matching—the carpet running lengthwise.

(24) Find the total cost of 12 scantlings 24"x3"x4"; 30 planks 2"x18"x24', and 400 ft. of lumber at \$15 per M.

(25) A road is 4 rods wide and contains 32 acres, how long is it?

(26) How high must wood be piled upon a rack 12 ft. long and 4 ft. wide, so that there may be one and a half cords?

(27) Find the cost of the boards for a close fence 7½ ft. high around a school-yard containing one acre, at \$12 per M., the yard being 8 rods wide.

(28) Find the cost of 3 loads of wheat containing: 54 bus. 26 lbs.; 49 bus. 54 lbs.; and 51 bus. 30 lbs., at 60 cents a bushel.

(29) A gravel bank has a surface area of one acre, and is 3½ ft. deep. What length of road 14 ft. wide and 9 in. deep will it gravel?

(30) Divide 279 acres, 139 rods, 26 yds., 3 sq. in., by 68.

(31) Find the difference between 99 miles, 319 rods, 25 yds., 2 ft., 11 in., and 100 miles.

(32) Find the cost at 12 cents per sq. yd. of plastering the walls and ceiling of a room 21 ft. long, 12 ft. wide and 9 ft. high. It has 4 openings, each 8 ft. by 4 ft.

(33) How many yards of carpet 30 in. wide will be required to carpet a room 18 ft. long and 15 ft. wide. What will it cost at 95 cents a yard?

- (34) A boy takes 2 ft. at a step ; how many miles, etc., will he go in 6787 steps ?
- (35) A mower cuts 8377 sq. ft. in one cut ; how many acres, sq. rods, etc., are there in 49 cuts ?
- (36) A farmer had 89 tons of hay. He sold 7 tons 1146 lbs. to A., and 8 tons 1348 lbs. to B. He then divided the remainder into 8 equal portions. How many tons and lbs. in each ?
- (37) Subtract 16 bus. 3 pk. 1 pt. from 23 bus. 1 gal. 3 qt., and divide the difference into seven equal parts.
- (38) Reduce 756345 inches to higher denominations.
- (39) How much will it cost to sod a lawn 42 ft. long and 24 ft. wide at 7 cents a sq. yd., deducting space for a gravel walk 3 ft. wide down the entire length of the lawn ?
- (40) If a cub. ft. of water weigh 1000 oz., and a gallon of water weigh 10 lbs. ; how many gal. will a rectangular tank 8 ft. long, 6 ft. wide and 8 ft. deep contain ?
- (41) Express 183997 yards in miles and rods.
- (42) How many acres are there in a square field, a side of which is 7260 ft. ?
- (43) Assuming the length of a person's step is 2' 6", how many steps does he take in walking 3 miles, 720 yds. ?
- (44) Find the cost of building a sidewalk an eighth of a mile long and 4 ft. wide, with planks $1\frac{1}{2}$ in. thick, at \$12.50 per M.
- (45) What is the length of the carpet for a flight of stairs of 24 steps, each $10\frac{1}{2}$ in. wide and $7\frac{1}{4}$ in. high ?
- (46) In digging a ditch 140 rods long and 6 ft. deep, 3465 cubic yards of earth were removed. How wide was the ditch ?
- (47) What is the surface area of a block of stone 4 ft. long, 28 in. wide and 18 in. deep ?
- (48) What is the value, at \$68 per acre, of the land in a road 40 miles long, 8 rods wide ?
- (49) A farmer sold 2250 lbs. of wheat at 96 cents a bushel, and 1190 lbs. of oats at 36 cents a bushel ; he spent 60 cents, and with the remainder bought coal at 30 cents a cwt. How many tons did he buy ?
- (50) A farm containing 50 acres is 40 rods wide. How

many miles of straight fence are required to go around it, and what will the fence cost at $1\frac{1}{2}$ cents a foot?

(51) A stick of squared timber is 18 in. by 15 in., and 75 ft. long. What is it worth at \$12 per M., board measure?

(52) A half acre lot is 10 rods long. A 5-strand wire fence is put round it. How much wire, at 5 cents a lb., will be required if 2 yards cost 3 cents?

(53) Find the total weight in lbs. of: 3 bbls. flour; 2 bbls. of beef; 20 bush. of potatoes; 12 bush. of rye; 5 bush. of oats, and 9 bush. of barley.

(54) How many 2-inch pickets placed 3 in. apart, will fence a half acre lot of 66 feet frontage?

(55) How many feet of lumber are required for a 12-inch baseboard around a field 40 rods by 30 rods?

(56) If a room be 12 ft. square, what must its height be in order that the area of the walls may amount to 60 square yards?

(57) Find the value of a pile of wood 40 ft. long, 24 ft. wide and 6 ft. high, at \$5.75 a cord.

(58) Find the value of a field 50x32 rods, at \$95.50 an acre.

(59) Allowing 90 cubic feet of air for each pupil, how many pupils could be accommodated in a school-room 27 ft. long, 18 ft. wide and 10 ft. high?

(60) At 15 cents a square yard, find the cost of painting both the floor and the ceiling of a room 27 feet long and 21 ft. wide.

(61) A bag of grain weighs 1 cwt. 45 lbs. 3 oz., how much less than 45 tons would 18 bags of such grain weigh?

(62) A square school site, of 13 rods 1 ft. 6 in. on each side, has trees planted all around it. There is a tree in each corner of the site, and along the whole length of each side there are 9 trees. How many trees are there, and how far apart?

(63) To pay his rent on 75 acres at \$2.75 an acre, a tenant has sold 2350 lbs. of barley at 78 cents a sack of 100 lbs.; how many bushels of wheat at 88 cents a bushel will he need to sell to make up the balance?

(64) How many times must a boy walk round a playground 140 ft. long and 70 ft. wide, in order to walk seven miles?

(65) A farmer sold peas in a field containing 10 acres, and he spent \$5.75 in labor. He sold the peas at 85 cents a bushel, and found that after paying expenses of labor, he had \$335.95 left. How many bushels per acre had he?

(66) Make out the following pay sheet, 10 hrs. = 1 day:

	M.	T.	W.	T.	F.	S		
A....	9	7	10	10	8	6	\$2.00	\$
B....	10	8	9	10	10	5	\$1.90	\$
C....	.8	9	10	10	10	4	\$1.80	\$
D....	10	9	10	10	8	5	\$1.60	\$
								\$

Exercise XXXIV.—BUSINESS TRANSACTIONS.

A.

Find the total value of the articles in each of the following nine examples:

(1) 214 lbs. butter at 18c.; 103 lbs. cheese at 14c.; 112 doz. eggs at 15c.; 236 qts. milk at 6c.; 125 bush. potatoes at 49c.; and 87 bush. carrots at 58c.

(2) 81 bush. wheat at 89c.; 67 bush. barley at 63c.; 36 bush. oats at 34c.; 53 bush. peas at 57c., and 73 bush. corn at 77c.

(3) 76 bush. turnips at 42c.; 84 bush. beets at 75c.; 112 bush. parsnips at 87c.; 137 bush. onions at 82c.; 29 bush. tomatoes at 50c., and 85 doz. cabbages at 53c.

(4) 137 bbls. apples at \$2.13; 64 bush. plums at \$1.05;

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108 bush. peaches at \$1.87; 93 bush. cherries at \$1.40, and 85 bush. pears at \$1.95.

(5) 26 lbs. rice at 4c.; 34 lbs. tapioca at 13c.; 42 lbs sago at 12c; 25 lbs. barley at 5c.; 39 lbs. dried apples at 8c., and 22 lbs. prunes at 9c.

-(6) 25 bbls. flour at \$5.50; 36 bags flour at \$2 80; 18 bags bran at 85c.; 15 stone oatmeal at 37c.; 17 stone cornmeal at 36c., and 29 lbs. wheat meal at 5c.

-(7) 27 lbs. pork at 14c.; 35 lbs. beef at 12c.; 19 lbs. mutton at 16c.; 14 lbs. veal at 12c.; 17 lbs. lamb at 15c., and 24 lbs. ham at 13c.

(8) 13 tons hard coal at \$6.25; 17 tons soft coal at \$4 50; 19 cords maple at \$3.75; 24 cords oak at \$3.60; 16 cords pine at \$4.25, and 23 tons coke at \$3.70.

-(9) 34 yds. cotton at 12c.; 41 yds. cashmere at 57c.; 39 yds. flannel at 35c; 56 yds. muslin at 17c.; 67 yds. print at 18c., and 52 yds. lace at 99c.

-(10) A man exchanges 14 bush. wheat for 24 bush of barley, when 12 bush. wheat are worth \$11.52. Find the difference between the prices of 7 bush. wheat and 7 bush. barley.

(11) A milkman bought 40 gal. of new milk at 16 cents a gal., and 60 gal. of skimmed milk at 2 cents a quart. Having mixed together, he sold the mixture at 24 cents a gallon. Find his gain.

-(12) I bought 167 bush. wheat at \$1.65, and 287 bush. oats at 37 cents. I sold the wheat at a loss of 4 cents a bush, and 34 bush. oats at a gain of 18 cents a bush., and the remainder at a gain of 13 cents a bush. What was my gain on these transactions?

B.

-(1) A farmer bought from a merchant 11 yds. of cloth at \$1.25 a yd; $\frac{1}{2}$ doz. ties at \$4.12 a doz.; 17 yds. of print at 23 cents a yd, and 3 collars at \$2.40 a doz. He handed him in payment \$25. How much change did he get?

(2) A merchant bought 13 doz. oranges for \$3.75. He gave away nine, and sold the remainder at the rate of 3 oranges for 10 cents. Find his gain.

- (3) A dealer bought 8,946,750 pounds of hay at \$10 a ton, and sold it for 68 cents a cwt. Find his gain.
- (4) How many loads of potatoes, each containing 15 bush., worth 42 cents a bush., will pay for 12 rolls of carpet, each containing 56 yds., at 75 cents a yard?
- (5) Make out the following bill: You, a merchant, sold Hubert Kent, to-day, 14 yds. cotton at $5\frac{1}{2}$ c.; 7 yds. tweed at \$1.25; trimmings for \$2.75; 14 lbs. tea at 35c., and 90 lbs. sugar at 18 lbs. for a dollar. You took in exchange a tub of butter weighing 65 lbs. at 19c. a lb.
- 54 (6) Find the total cost of: 840 pens at 7 for $2\frac{1}{2}$ cents; 1080 pencils at \$1.50 a gross; 3000 sheets of paper at \$2.20 a ream, and 720 exercise books at $7\frac{1}{2}$ cents a score.
- (7) A farmer exchanged a load of oats weighing 1734 lbs. for 2 pairs of boots at \$2.50 a pair, and 155 lbs. of sugar at 5 cents a lb. What were the oats worth a bush.?
- (8) A paid \$16 for 20 gal. of syrup, and mixed it with 10 gal. worth 60c. a gal. He sold the whole at 25 cents a quart. Find his gain.
- (9) Find the value of 16500 lbs. of beans at 60c. a bush.; 33660 lbs. oats at 17c. a bush., and 47190 lbs. of wheat at \$1.00 a bushel.
- (10) John Adams bought 375 tons of hay at \$9 a ton. He paid \$1 a ton for pressing it into bales of 75 lbs. each. How much must he charge for each bale so as to gain the cost of one bale on every three bales sold?
- (11) Farmer Frank Hamilton sold to a merchant the following articles to apply on an overdue account of \$54.45: 1680 lbs. of hay at \$15 a ton, $3\frac{3}{4}$ cords wood at \$4.80 a cord, 4 bbls. apples at \$2.75 a bbl., 350 lbs. flour at \$2.50 a cwt., and 30 lbs. 10 oz. of butter at 16 cents per lb. Make out the account showing the balance, and to whom due.
- (12) Thos. Jones received \$212.24 for his grain. He sold 16422 lbs. oats at 28 cents per bushel, and 6600 lbs. of wheat. How much per bushel did he get for his wheat?

C.

(1) Bruce Duguid bought 7 qts. coal oil at 16c. a gal., 1 lb. 8 oz. tea at 40c. a lb., 10 lbs. flour at \$2.50 per cwt., $6\frac{1}{2}$ lbs. fish at 10c. a lb., 48 oz. of butter at 17c. a lb. Find the amount of his bill.

(2) Make out in proper form, supplying dates : Mrs. Walter Jessop took to Chas. G. Fraser's store, 16 lbs. butter at 15c. a lb., and 14 doz. eggs at 13c. a doz. She bought $4\frac{1}{2}$ lbs. cheese at 13c. a lb., 6 lbs. biscuits at 3 lbs. for 25c., 14 yds. print at 11c. a yd., 10 lbs. tea at 35c. a lb., and one dollar's worth of sugar. How much will settle the bill?

(3) Make out a bill of the following : You sold Frank Dickson 146 yds. cotton at 7c. a yd., 156 eggs at 14c. a doz, 17 pairs boots at \$3.50 a pair, and 98 lbs. of salt at 4c. a lb.

(4) A grocer mixed 15 lbs. of tea worth 40c. a lb., 8 lbs. worth 60c., and 12 lbs. worth 30c. He sold it to gain \$7.30 ; find the selling price per pound.

(5) A drover bought 27 cows at \$29 each, and 39 cows at \$37 each. Find how much he must sell each cow for to gain \$480 on the whole.

(6) Bought 75 cows for \$38.25 a head, fed them 9 tons of hay at \$16.25 a ton, and sold them at \$60.20 a head. Find my gain per head.

(7) Find the total cost of the following : 19 lbs. 12 oz. butter at 28c. per lb.; 1848 lbs. of hay at \$15 per ton ; 49 bush. 24 lbs. barley at 30c. per bush., and 65 geese at \$1.40 a pair.

(8) Find the total cost of : 26 yds. silk at \$1.45 ; 4 yds. linen at 15c.; $2\frac{1}{2}$ yds. lining at 20c.; 4 yds. muslin at 11c.; 2 doz. buttons at 25c.; 12 yds. flannel at 38c.; 5 yds. cotton at 14c.; 2 pairs gloves at \$1.25 ; $3\frac{1}{2}$ yds. ribbon at 42c., and a silk handkerchief for \$1.45.

(9) What is the cost of : 560 lbs. hay at \$9 a ton ; 4320 lbs. of wheat at 65c. a bush., and 325 ft. of lumber at \$11 per M.?

(10) A man bought 4750 lbs. hay at \$20 a ton, and sold it at \$1.15 per cwt. What did he gain?

(11) Make out the total cost of: 2880 lbs. wheat at 79c. a bush.; 612 lbs. oats at 28c. a bush.; 4350 lbs. peas at 42c. a bush., and 518 lbs. corn at 44c. a bush.

D.

(1) A farmer sold $40\frac{3}{4}$ bush. of wheat at 80c. per bush.; $86\frac{3}{4}$ bush. rye at 66c. per bush., and 14500 lbs. hay at \$9.50 per ton. He bought 110 lbs. sugar at the rate of 20 lbs. for \$1; $42\frac{1}{2}$ yds. carpet at 95c. a yd., and 47 yds. of cloth at 86c. for 2 yds. How much money did he have remaining?

(2) Write neatly the following bill: Bought at Osgoode on May 27, 1897, from William Muir, 24 lbs. tea at 36c; 85 lbs. sugar at 7c.; 44 lbs. rice at 5c., and 3 pairs of boots at \$2.50 a pair. Gave him 4 hams, each weighing 29 lbs., at 14c. a lb., in part payment.

(3) Tom Loudon bought, from Alan Taylor on Jan. 2nd, last, as follows: 3 pr. hinges at 13 cents; 2 axe handles at 25c. each; 6 lbs. nails at $3\frac{1}{2}$ c. a lb.; $5\frac{1}{2}$ lbs. wire nails at 4c. a lb.; 2 shovels at \$1.05 each; 3 cans white lead at \$2.45 a can; 11 ft. of chain at 7c. a ft.; 10 curtain rings at $1\frac{1}{2}$ c. each. Make out the bill and receipt it.

(4) A man bought 288 bottles of wine at 70 cents a bottle; 9 bottles were broken, and he sold the remainder at \$10.75 a dozen. Find the gain.

(5) Make out and receipt a bill for the following articles: 700 lbs. flour at \$2.25 per cwt.; 3 ladders at \$1.50 each; 100 ft. rubber hose at 20c. a foot. On the above account \$20 was paid.

(6) Find the total value of 13 lbs. 6 oz. of butter at 20c. per lb., and 1110 eggs at 14 cents per dozen.

(7) A grocer sold 3 oz. of tea for 15 cents. How much cheaper is this than \$1 per pound for tea?

(8) Make out a bill for the following: 4 lbs. 4 oz. butter at 20c. per lb.; 3 qt. 1 pt. coal oil at 6c. a qt.; 16 yds. cloth at 49c. a yd.; 4 spools of thread at 5 for 20c.

(9) A drover bought 29 sheep at \$3.75 each, and 74 others at \$4.50 each. How much will he gain or lose by selling them all at \$4.40 each?

(10) A grocer bought 3 bbls. vinegar, each containing 30 gal. 2 qt. 4 pt., at 32c. a gal., and sold it at 9c. a quart. Find his profit.

Exercise XXXV.—WAGES.

A.

(1) A man earns \$2.15 a day. How much will he earn in the month of August, the first day of which is Tuesday?

(2) A man working 9 hours a day at 27 cents an hour will earn how much in 3 weeks?

(3) How much will a boy earn in a fortnight, who earns 15 cents an hour and works ten hours a day?

(4) A carpenter worked a certain number of days, and received \$41.25; if he had worked 22 days more he would have received \$68.75. How many days did he work?

(5) A man receives a yearly salary of \$700, paid monthly. How much does he receive each month?

(6) A man earning \$2.50 a day—ten hours—lost 15 hours in one week. What were his wages for that week?

(7) A man receives a yearly salary of \$1196, paid weekly. How much does he receive each week?

(8) At the rate of \$2.61 a day of nine hours, how much should a machinist receive for 143 hours' work?

(9) If a man receives \$1.95 a day, how much will he earn in the month of June, the first day being Sunday?

(10) A paper-boy buys 3 papers for 2 cents, and sells them for a cent each. On Mon. he sold 64 papers, on Tues. 60, on Wed. 69, on Thur. 74, on Fri. 83, and on Sat. 112. How much did he clear during the week?

B.

(1) If 20 men can do a work in 12 days, and 40 boys can do it in 8 days; which will be the cheaper, to get

boys to do the work at 40 cents each per day, or men at 75 cents each per day, and how much?

(2) If 2 boys earn as much as a man, and it takes a man 24 days to do a work for which he gets \$36, how much should a boy get for a day's work?

(3) What will be the amount of a man's wages for 13 days of 9 hours each at 23 cents an hour?

(4) Three brothers, A, B, and C, worked together for 17 days. Their wages amounted to \$42.50. C received as much as A and B together, and B received 25 cents a day more than A. How much did A receive per day?

(5) A man's wages are \$2.25 a day of 9 hours, and 35 cents an hour for overtime. How much ought he to receive for 18 full days and 27 hours over time?

(6) If a mechanic earns 75 cents in an hour, how much does he earn every 4 minutes?

(7) If a man earns \$2.80 a day and spends \$4 a week, how much does he save in a year?

(8) If a milkman received \$42 for his milk sales for a week, find his average daily sales, if he gets 5c. a quart.

(9) A boy wishes to earn \$6.50; when he earns three-fifths of this sum, how much must he still earn?

(10) The weekly wages of 23 men are \$2328.48. How much a day does each man earn?

C.

(1) If a boy saves three 10-cent pieces a week, how long will it take him to save enough to buy a coat worth \$4.20?

(2) A farmer pays a laborer \$1.75 a day. How much should the laborer receive for the month of May, if the first day of the month was Wednesday?

(3) A binder received \$151.25 for working a certain number of days; if he had worked 13 days more he would have received \$167.50. Find his daily wages.

(4) A boy hires with a farmer for two years upon the condition that his wages be increased 75 cents each month. If he receives \$1.50 the first month, what will his entire wages amount to?

(5) A man agreed to draw 129 loads of gravel for road purposes at \$1.45 a load; he paid a boy 15 cents a load for helping him with 87 loads. If it took him 40 days to do the work, how much did he make on an average per day?

(6) The wages of 17 men for a week are \$159.12. How much did each man earn in a day?

(7) A contractor engages 3 men and 5 boys to do a piece of work, giving a man 60 cents a day more than a boy. They are engaged nine days at the work, and all together receive \$70.20. Find their daily wages.

(8) A boss carpenter agreed to build a woodshed for \$96. He employed two men for \$1.25 a day each, and they finished the job in 15 days. How much per day did the carpenter make?

(9) A man engaged with a farmer from the 1st of May to the 29th Nov., inclusive, at \$1.25 for every day he worked. Allowing 33 days for Sundays and holidays during this time, find how much he earned.

(10) Make out the following pay sheet; a day=10 hours.

	M.	T.	W.	T.	F.	S.		
A....	10	6	10	9	10	5	\$2.50	\$
B....	10	10	10	9	9	4	\$2.00	\$
C....	8	7	5	10	10	5	\$1.80	\$
D....	9	10	9	10	8	5	\$1.60	\$
E....	10	5	10	7	10	3	\$1.50	\$
								\$

Exercise XXXVI.—PROFIT AND LOSS.**A.**

- (1) I buy 2048 bus. potatoes at 88c. a bus., and sell them at 97c. a bus. Find my gain.
- (2) Bought 315 lbs. of butter at 11c. and sold it at 17c. What was my gain?
- (3) What do I lose by buying 207 cords of wood at \$4.25 per cord and selling at \$3.78?
- (4) If I purchase 905 bus. wheat at \$1.47 per bus., and sell it at \$1.31. What do I lose?
- (5) Bought 13 bbls. sugar, each weighing 317 lbs. net. at 7c. per lb., and sold the whole for \$500. Find my gain.
- (6) A grocer buys \$300 worth of sugar and sells it at a profit of \$20 on every \$100 worth. How much does he gain?
- (7) A grocer buys \$400 worth of tea, and makes \$25 profit on every \$100 of cost. How much does he sell the tea for?
- (8) A grocer mixes together 45 lbs. coffee worth 22c. a lb., and 54 lbs. worth 36c.; and sells the mixture for 34c. a lb. Does he gain or lose and how much?
- (9) A boy bought 16 pecks of nuts at 75c. a peck, and sold them for 10c. a quart. How much did he gain?
- (10) By selling 98 bus. wheat at 92 cents a bus., a grain buyer lost \$1.94. How much should he have sold it for to gain \$1.94?
- (11) A farmer bought 30 cows for \$540; he fed them for one year at a cash expense of \$7.50 per head, and sold the entire herd for \$27.50 each. Did he gain or lose, and how much?
- (12) A book agent bought 90 books at \$2.75 each, his expenses were \$13.75. He was unable to collect for 3 books. Find his gain, if they were sold for \$5.25 each.
- (13) A dealer bought 8 gross of lead pencils at \$2.50 a gross, and sold them at 15 cents a dozen. How much did he lose?

B.

(1) A fruit dealer bought 243 dozen of oranges at 13c. a doz.; 102 oranges were spoiled. He sold the rest at the rate of 14 for 25c. How much did he gain?

(2) A man bought a house and lot for \$8375; he built an addition to the house at a cost of \$1735. The house was destroyed by fire, and he received as insurance \$4560; he then sold the lot for \$2045. How much did he lose?

(3) A grocer bought 49 loads of potatoes of 20 bush. each at 60c. a bush. Allowing 15 bush for waste, would he gain or lose by retailing the rest at 25c. a peck, and how much?

(4) A boy bought 210 apples at the rate of 3 for 5c., and traded them for 150 oranges, which he sold at the rate of 3 for 8 cents. How much did he clear?

(5) A farmer bought a horse for \$125 cash; he traded him for a yoke of oxen, and gave \$13 into the bargain. One of the oxen died, and he sold the other for \$73. How much did he lose?

(6) A man bought 123 head of young cattle for \$27.50 a head. He paid \$11.35 a head for fattening them, and then sold the entire lot for \$6150. How much did he gain or lose?

(7) A drover bought 247 sheep for \$5 each. It cost \$149 to get them to market, and 8 sheep died on the way. He sold the remainder at \$6.75 a head. How much did he gain?

(8) A butcher pays \$119.25 for 159 turkeys. At how much a pair must he sell them to gain \$41.34?

(9) A fruit dealer bought 9 bushels of cherries at \$3.50 a bushel, and sold them at 20 cents a quart. Did he gain or lose, and how much?

(10) A grocer bought 12 bbls. of pork at \$14 a bbl., and retailed it at 10c. a lb. Find his gain.

(11) A farmer bought a 20-acre field of ripe wheat for \$250. He paid \$1.45 an acre for cutting and saving, 4 cents a bushel for threshing and cleaning, and \$2 a load (46 bushels) for teaming. The wheat yielded 23 bus. to

the acre, and was sold for \$1.37 a bushel. How much did the farmer clear?

(12) A merchant buys at 65 cents on the dollar a bankrupt stock which cost, per invoices, \$5250. He sold half of it clearing 5c. on the \$., a third of it he sold at a gain of 7c. on the \$., and the balance at a loss of 12c. on the \$. Did he gain or lose on the whole, and how much?

(13) A man buys a bankrupt stock at 57c. on the \$., which cost \$2500 per invoices, and sells it at an average of 75c. on the \$. How much does he pay for the goods, and how much does he gain?

Exercise XXXVII.—ANALYSIS.

A.

- (1) If 8 yards of cloth cost \$8.40, what will 24 yards cost?
- (2) If 10 yards of cloth cost \$14.50, what will 19 yds. cost?
- (3) How many apples can be bought for \$1.36, if 23 apples cost 8 cents.
- (4) If 72 men do a piece of work in 96 days, how long will it take 288 men to do the same work?
- (5) How long will it take 9 men to do the same amount of work that 6 men can do in 15 days?
- (6) If 5 bbls. of flour cost \$60, how many cords of wood at \$9 a cord will pay for 3 bbls. of flour?
- (7) If 8 horses plough 12 acres in a day, how much will 20 horses plough in 2 days?
- (8) A bankrupt pays 59 cents on the dollar; what will a man lose to whom he owes \$13675?
- (9) A dealer bought 468 turkeys at \$7.50 a dozen, and sold them at \$1.50 a pair; find his gain or loss.
- (10) A newsboy made \$100 in a year, by buying papers at 20 cents a dozen and selling them for 45 cents a dozen. How many papers did he sell?
- (11) If a train moves 48 feet in a second, what is its rate in miles per hour?

(12) A woman sold eggs at 10 cents a dozen, gaining thereby 2 cents on each dozen. How much did 600 eggs cost?

B.

(1) If 40 men can do a piece of work in 60 days, how long will 15 men take to do half as much?

(2) Three turkeys cost \$2.25, and three geese cost as much as two turkeys. Find the price of 5 turkeys and 4 geese.

(3) If 6 men dig a trench 34 yards long in 10 days, how long a trench can 20 men dig in 15 days?

(4) A father earns \$6 while his son earns \$2.75. When they both have earned \$105, how much will belong to each?

(5) If 3 horses cost \$192, and 2 horses cost as much as 16 sheep, find the combined cost of 5 horses and 6 sheep.

(6) If 11 men build a wall in 18 days, how many men will it take to build a wall three times as long in half the time?

(7) A man can buy a white hat which will last him 4 months for \$1.76. He can buy a black hat which will last him 9 months for \$5.67. How much will be saved in 6 years by buying the cheaper kind of hat?

(8) If the yearly rent of a farm of $187\frac{1}{2}$ acres be \$450, what will be the rent of a square mile for 20 months?

(9) A piece of work is to be done by 25 men in 16 days; after 4 days 15 men go away. How long will it take the rest of the men to finish the work?

(10) A clock which loses 4 min. in 12 hours is 10 min. fast at midnight on Sunday. What o'clock will it indicate at 6 o'clock on Wednesday evening?

(11) The weekly wages of 4 men and 5 boys are \$58.50. If a man earns twice as much as a boy, what are the daily wages of each?

(12) A case of oranges containing 36 dozen was bought for \$7.20, and sold at the rate of 12 for a quarter of a dollar. Find the gain on it.

C.

- (1) A drover bought a number of cattle for \$4050. He sold 34 of them for \$1836, gaining \$306 on those sold. Find how many he bought and the cost of each.
- (2) Divide \$87.50 among three boys A, B, and C, so that for every \$1 A gets, B may get \$2 and C \$4.
- (3) A man exchanges 48 sheep for 192 lambs, when 12 sheep are worth \$48. Find the difference between the cost of 9 sheep and 9 lambs.
- (4) A boy buys 30 oranges at the rate of 3 for 8 cents, and sells them at the rate of 5 for 14 cents. How much does he gain?
- (5) A purse and the money in it were worth \$21.63; the amount of money was six times the cost of the purse; find the value of the purse.
- (6) Divide \$28217 between two men, giving one three-fourths of what the other receives.
- (7) A railway charges a cent a mile for the first 50 miles for carrying a cord of wood and then 3 cents for every 4 miles beyond the fifty. What will it cost to carry 250 cords 90 miles?
- (8) If a bushel of wheat makes 40 lbs. of flour, how many barrels of flour can be made from 4263 bushels of wheat?
- (9) If a boy walking at the rate of 4 miles an hour, takes 18 minutes to get to school, how long will he take if he walks 3 miles an hour?
- (10) Goods are bought for \$5000 and sold to make \$30 profit on every \$100 cost. What were the goods sold for?
- (11) A man bought a farm for \$3600 and sold it clearing \$25 on every \$100 purchase money. Find the selling price.
- (12) An agent sold a house and lot for \$6000, and for his services received \$5 on every \$100. How much did the owner receive?

D.

- (1) I buy groceries to the amount of \$475, and by paying cash I get \$5 allowed off every \$100 worth. How much do I pay?

(2) If the tax on every dollar's worth of property is 2 cents, find the taxes on a house and lot valued at \$4600.

(3) A man's property is assessed for \$7200. How much taxes does he pay, being charged 2c. on the dollar?

(4) If the rate of taxation is 3c. on the \$, what do the taxes on property worth \$3500 come to?

(5) If the rate of taxation is 2c. on the \$, what do the taxes on property worth \$2345 come to?

(6) \$3645 is to be collected in a township to build a school-house. The property in the township is rated to be worth \$370170. What will Frank Connery have to pay, whose property is worth \$4570?

(7) A money lender receives 6 cents for loaning \$1 for one year. What does he receive for loaning \$200; \$350; \$475; for one year?

(8) If the money lender received 5 cents for the loan of \$1 for one year, what would he get for the loan of \$250 for 2 years? for the loan of \$300 for 4 years? for the loan of \$425 for 3 years?

(9) If he received \$5 for loaning \$100 for one year, what would he receive for the loan of \$630 for 2 years? \$741 for 3 years? \$500 for six months? \$224 for 1½ years? and \$360 for 2 years 8 months?

(10) A boy puts \$25 in the Dominion Bank for a year. He received for the use of it at the rate of \$4 for \$100. How much money did he withdraw at the end of the year?

Exercise XXXVIII.—SHARING.

A.

(1) Divide 16 apples between John and James, giving John 4 more than James.

(2) Divide 60 marbles between Thomas and Henry, giving Henry 10 more than Thomas.

(3) Robert has 6 pigeons more than William; together they have 22. How many has each?

- (4) A man walked 52 miles in two days. The first day he walked 6 miles more than he did the second day. How far did he go each day?
- (5) Divide \$1000 between two men, giving one \$120 more than the other.
- (6) If \$2845 be divided between A and B, so that A receives \$265 more than B, find A's share.
- (7) If \$1631 be divided between A and B, so that B receives \$161 less than A, find A's share.
- (8) If \$80 be divided between A and B, so as to give A \$7.40 more than B, how much will B receive?
- (9) Divide \$1 among Frank, Harry and Tom, giving Frank 6 cents more than Harry, and Tom 4 cents more than Frank.
- (10) Divide 50 apples among John, Annie and Mary, giving to John 2 more than to Annie or Mary.
- (11) Divide \$127 among three men, giving the first \$3 more than the second, but \$7 less than the third.
- (12) A man sold 3 sheep for \$34. For the first he received \$4 less than for the second, but \$3 more than for the third. What did he get for each?

B.

- (1) Divide \$541 among A, B and C, giving A twice as much as B, and C \$25 more than three times as much as B.
- (2) Divide \$1500 among A, B and C, so that A may have \$60 more than B and twice as much as C.
- (3) If \$3973 be divided among A, B and C, so that B gets \$23 more than A and \$27 less than C, find the share of each.
- (4) If \$377 be divided among A, B, and C, so that A's share is \$7 more than B's share, and B's share \$5 more than C's share; find A's share.
- (5) Divide \$82.60 among 27 men and 37 boys, so that each man may have three times as much as a boy.
- (6) Divide \$89.16 among three boys, Lyle, Bert and Robbie, so that the first boy may have \$2.18 more than the second, but 80 cents less than the third.

(7) A mixture of green and black teas is made, 3 ounces of green to every 5 ounces of black. How much of each kind will be in 5 pounds?

(8) Divide 36 apples among 2 boys and 3 girls, so that each boy may receive 3 apples more than each girl.

(9) Divide \$398 among A, B and C, giving B three times as much as A, and C \$6 more than B.

(10) Ernest has \$1000, Warren has as much as Ernest less \$82, John has as much as Ernest and Warren and \$694 besides. If the whole of their money were divided equally among them, how much would Warren have more than he has now?

(11) A man spent \$240.25 in cloth at \$1.55 a yard, and sold it to three men. The first man bought 35 yards more than three times the second man's purchase, but 22 yards less than the third man. Find how many yards each bought.

C.

(1) Divide \$840 among A, B and C, giving A three times as much as B, and \$70 more than C.

(2) Manly, Ernest and Beulah had \$1800 divided among them, Ernest got twice as much as Manly, and Beulah got twice as much as both Ernest and Manly. How much did each get?

(3) Divide \$973 between A and B, giving A \$57 more than B.

(4) Divide 27 bushels potatoes between A and B, giving A 2 bus. 3 pks. more than B.

(5) Divide \$500 among A, B and C, so that A will get \$75 more than B, and C \$50 more than A.

(6) A calf, a cow and a colt were sold for \$110. The colt brought \$15 less than the cow, and the calf \$25 less than the colt. What did they each bring?

(7) A woman sold two tubs of butter weighing together 60 pounds, one being 5 lbs. 8 oz. heavier than the other. How much did each tub weigh?

(8) In a basket there are nuts, oranges and apples, 135 in all. There are 35 apples and oranges, and 110 oranges and nuts. How many are there of each?

(9) Divide \$2640.50 among 4 men, 6 women and 8 children, giving to each man double a woman's share, and each woman three times a child's share.

(10) A father earns \$5 while his son earns \$3. When they have together earned \$1098.32, how much will belong to each?

Exercise XXXIX.—CANCELLATION.

A.

What is the quotient of:

- (1) $42 \times 13 \times 6 \times 22$ divided by $4 \times 6 \times 7 \times 13$?
- (2) $5 \times 22 \times 12 \times 21 \times 42$ divided by $10 \times 4 \times 27 \times 22$?
- (3) $25 \times 18 \times 60 \times 49$ divided by $7 \times 24 \times 75$?
- (4) $56 \times 54 \times 60 \times 63 \times 4$ divided by $72 \times 70 \times 48 \times 9$?
- (5) $25 \times 24 \times 22 \times 21 \times 26 \times 32 \times 28 \times 33$

$$\frac{55 \times 20 \times 84 \times 39 \times 14 \times 44 \times 96}{}$$

$$(6) \frac{36 \times 38 \times 39 \times 40 \times 42 \times 44 \times 45 \times 49 \times 150}{30 \times 30 \times 57 \times 78 \times 70 \times 24 \times 99 \times 35 \times 4}$$

$$(7) \frac{50 \times 51 \times 54 \times 56 \times 55 \times 58 \times 60 \times 63 \times 64 \times 4}{40 \times 40 \times 85 \times 27 \times 48 \times 88 \times 29 \times 84 \times 45}$$

$$(8) \frac{12 \times 13 \times 14 \times 15 \times 16 \times 35 \times 20 \times 21 \times 22 \times 24}{39 \times 56 \times 40 \times 30 \times 70 \times 33 \times 48}$$

$$(9) \frac{21 \times 20 \times 22 \times 24 \times 25 \times 26 \times 27 \times 28 \times 30 \times 32 \times 33 \times 35}{70 \times 14 \times 33 \times 72 \times 45 \times 65 \times 70 \times 12 \times 88 \times 60}$$

(10) At what price per yard will 15 bales of cloth, each containing 12 pieces of 42 yards each, pay for 150 rolls of carpet of 75 yards each at \$2.10 per yard?

B.

(1) What must be the length of a box 6 ft. wide and 4 ft. high to hold $1\frac{1}{2}$ cords of wood?

(2) Divide the continued product of 16, 18, 25, 24, 36 and 45, by the continued product of 100, 72 and 27.

(3) Nine pieces of cloth containing 30 yards each, worth \$5 a yard, were exchanged for 15 pieces of cloth containing 45 yards each. What was the second cloth worth per yard?

(4) If a farmer exchanges 25 bushels wheat at \$1.28 a bus. for cloth at 40 cents a yd., how many yds. does he get?

(5) A tailor bought 24 pieces of cloth, each containing 22 yds., worth \$2.25 a yd. He made 54 suits of clothes; how much must he get per suit, so as to make \$3 profit on every suit?

(6) A brick is 9 in. long, 3 in. wide and 2 in. thick; how many of such bricks will there be in a pile 12 ft. 6 in. long, 10 ft. 8 in. wide and 6 ft. 9 in. high?

(7) A pile of bricks is $40 \times 27 \times 15$ feet, how many bricks $8 \times 4 \times 2$ inches are there in the pile?

(8) A pile of bricks is 8' 6" high, 14' long and 15' wide (each brick is $8\frac{1}{2}'' \times 4'' \times 2\frac{1}{2}''$); What is the pile worth at \$12.50 a thousand?

(9) Find by cancelling the simplest value of $\frac{6950}{45 \times 25 \times 3}$.

MECHANICAL WORK.

Exercise XI.—ADDITION.

(1)	(2)	(3)	(4)	(5)
47658	76584	65847	58476	84765
76584	65847	58476	84765	47658
65847	58476	84765	47658	76584
58476	84765	47658	76584	65847
84765	47658	76584	65847	58476
47658	76584	65847	58476	84765
76584	65847	58476	84765	47658
65847	58476	84765	47658	76584
58476	84765	47658	76584	65847
84765	47658	76584	65847	58476
47658	76584	65847	58476	84765
76584	65847	58476	84765	47658
(6)	(7)	(8)	(9)	(10)
56987	69875	98756	87569	75698
69875	98756	87569	75698	56987
98756	87569	75698	56987	69875
87569	75698	56987	69875	98756
75698	56987	69875	98756	87569
56987	69875	98756	87569	75698
69875	98756	87569	75698	56987
98756	87569	75698	56987	69875
87569	75698	56987	69875	98756
75698	56987	69875	98756	87569
56987	69875	98756	87569	75698
69875	98756	87569	75698	56987
		(74)		

Exercise XLI.—SUBTRACTION.

Subtract 487569 ten times in succession from each of the following: (1) 5221368; (2) 5332473; (3) 5443524; (4) 5554035; (5) 5659146.

Subtract 579864 ten times in succession from each of the following: (6) 5934432; (7) 6156564; (8) 6377886; (9) 6591108; (10) 6723321.

Exercise XLII.—MULTIPLICATION.

Multiply each of the following by 6 ten times in succession as a factor: (1) 16209; (2) 21612; (3) 32418; (4) 48627; (5) 64836.

Multiply each by 7 ten times in succession: (6) 12708; (7) 19062; (8) 25416; (9) 38124; (10) 57186.

Multiply each by 8 ten times in succession: (11) 11427; (12) 15236; (13) 22854; (14) 34281; (15) 45708.

Multiply each by 9 ten times in succession: (16) 10608; (17) 15912; (18) 21216; (19) 31824; (20) 42432.

Exercise XLIII.—DIVISION.

Divide each of the following numbers by 6 ten times in succession: (1) 653397497856; (2) 980096246784; (3) 1960192493568.

Divide by 7 ten times in succession: (4) 1794847732146; (5) 2692271598219; (6) 3589695464292.

Divide by 8 ten times in succession: (7) 8179765215232; (8) 12269647822848; (9) 24539295645696.

Divide by 9 ten times in succession: (10) 27740856694356; (11) 36987808925808; (12) 55481713388712.

Divide each of the following by 29 three times in succession: (13) 278424824; (14) 417637236; (15) 556849648; (16) 835274472.

Divide each of the following by 347 three times in succession: (17) 902990919876; (18) 1354486379814; (19) 1805981839752; (20) 2708972759628.

FACTORS AND MULTIPLES.

Exercise XLIV.—PRIME AND COMPOSITE NUMBERS.

- (1) Which of the following numbers are prime and which are composite: 3, 5, 6, 7, 11, 15, 27, 35, 39, 41, 43, 45, 51, 57, 63 and 75?
- (2) Write down the prime numbers less than 30.
- (3) Find the sum of the prime numbers between 30 and 50.
- (4) Find the sum of the composite numbers between 35 and 55.
- (5) Find the sum of both the prime and the composite numbers between 60 and 80.
- (6) Write down all the integers less than 25 and prime to it.
- (7) Find the sum of the integers between 80 and 100 that are prime to 90.
- (8) Write down the integers less than 24 and prime to it.
- (9) Find the sum of the composite integers between 100 and 120 that are prime to 110.
- (10) What numbers less than 150 are divisible by both 3 and 4?
- (11) What numbers less than 175 are divisible by both 5 and 6?
- (12) What numbers less than 200 are divisible by both 3 and 8?

Exercise XLV.—PRIME FACTORS.

Resolve into its prime factors each of the following numbers: (1) 30; (2) 36; (3) 108; (4) 112; (5) 128; (6) 210; (7) 324; (8) 504; (9) 555; (10) 728; (11) 1024; (12) 1000; (13) 1011; (14) 1050; (15) 1320; (16) 1768; (17) 1848; (18) 2934; (19) 3456; (20) 32320; (21) 345345; and (22) 456456.

What prime factors are common to: (23) 440 and 231? (24) 650, 635 and 540? (25) 55, 66, 77 and 121? (26) 42, 70, 156 and 210? (27) 256, 320 and 336? (28) 144 and 180?

Find the product of all the prime divisors common to: (29) 16, 24, 40; (30) 108, 81, 54; (31) 144, 180, 216; (32) 64, 96, 112, 136; (33) 75, 125, 165; (34) 306, 408, 510.

(35) The product of 2 consecutive numbers is 756. Find them.

(36) The product of 4 consecutive numbers is 1680. Find them.

(37) The product of 3 consecutive numbers is 2730. Find them.

(38) The prime factors of a number are 2, 3, 5, 7 and 11. Find the number.

(39) The prime factors of a number are 2, 2, 3, 3, 7, 13 and 19. Find the number.

(40) The prime factors of a number are the prime numbers between 10 and 30. Find the number.

Exercise XLVI.—GREATEST COMMON MEASURE.

A.

Find the greatest common divisor of each of the following: (1) 546 and 462; (2) 394 and 672; (3) 735 and 770; (4) 2121 and 2626; (5) 232 and 160; (6) 1628 and 4543; (7) 12341 and 30401; (8) 15561 and 13585; (9) 34, 100 and 120; (10) 32967 and 50061.

B.

Find the greatest common measure of the following :
 (1) 279 ft. and 651 ft.; (2) 1264 yds. and 634 rods; (3)
 \$333 and \$851; (4) 2882 gals. and 4543 gals.; (5) 12341
 ft. and 2788 rods; (6) 91 hours and 2431 minutes; (7)
 \$1463 and 11175 cents; (8) 6069 marbles and 23023
 marbles; (9) 11592 horses and 3289 horses; (10) 987
 lbs. and 20539 ounces; (11) 714 thirds and 2057 thirds;
 (12) 2769 tenths and 3195 tenths.

C.

- (1) What is the length of the longest chain that will exactly measure the length and the width of a piece of land 312 rods long and 168 rods wide?
- (2) Three scantlings, measuring respectively 12 ft., 16 ft. and 20 ft., were cut into the longest possible pieces of equal length. What was the length of a piece?
- (3) Two cisterns hold respectively 4672 and 5088 gallons. Find the largest barrel capable of measuring both cisterns.
- (4) Two journeys of 444 and 1295 miles are portioned off into equal daily distances. Find the daily journey.
- (5) What is the greatest length of rail that can be used, without cutting, to put a fence around a farm 3588 feet by 2880 feet? How many rails will be required for it if the fence be six rails high?
- (6) What are the least numbers which, taken from 893 and 965 respectively, leave remainders of which 7 is a measure?
- (7) Three lots measure respectively 84 ft. by 144 ft., 104 ft. by 128 ft., and 112 ft. by 96 ft. If these be laid out in square beds of the largest possible size, find the number of beds in each lot.
- (8) Find the largest number that is a factor of 54180, and of 134820, and of 240660.
- (9) Find the largest number that will divide 600 and 987, leaving the remainders 5 and 7 respectively.
- (10) What is the length of the longest measuring stick that will measure 84 ft., 56 ft. and 70 ft.?

(11) Find the length of the longest chain that will exactly measure both 7308 in. and 8004 in. Give answer in feet.

(12) Three drovers, A, B and C, bought sheep at the same rate per head. A's drove cost \$102, B's \$138, and C's \$99. Find how many each bought.

Exercise XLVII.—MULTIPLES AND COMMON MULTIPLES.

Form a table of the first nine multiples of: (1) 13; (2) 14; (3) 15; (4) 19; (5) 21; (6) 25; (7) 30; (8) 36; (9) 50; (10) 57; (11) 63; (12) 75.

Find three common multiples of each of: (13) 3 and 4; (14) 5 and 6; (15) 7 and 8; (16) 8 and 10; (17) 12 and 15; (18) 16 and 18; (19) 11 and 12; (20) 15 and 20; (21) 25 and 30; (22) 18 and 24.

Of what two integers are the following common multiples: (23) 30; (24) 35; (25) 42; (26) 56; (27) 84; (28) 96; (29) 121; (30) 132; (31) 187; (32) 119; (33) 169; (34) 289; (35) 631; (36) 221.

Exercise XLVIII.—LEAST COMMON MULTIPLE.

A.

Find the L. C. M. of:

- (1) 4, 8 and 12.
- (2) 12, 18 and 30.
- (3) 21, 28 and 35.
- (4) 2, 3, 4, 5 and 6.
- (5) 9, 12, 22 and 33.
- (6) 15, 18, 21 and 24.
- (7) 9, 12, 15, 18 and 20.
- (8) 4, 5, 9, 12, 15 and 20.
- (9) 10, 16, 24, 40 and 64.
- (10) 36, 45, 60, 75 and 84.
- (11) 25, 40, 75, 100 and 120.

ARITHMETIC

- (12) 13, 23, 26, 39, 46 and 78.
- (13) 4, 6, 8, 9, 12 and 15.
- (14) 42, 52, 36 and 156.
- (15) 3, 5, 6, 8, 15, 20 and 24.

B.

- (1) 5040, 7770 and 1848.
- (2) 24, 108, 180, 84, 96, 12 and 48.
- (3) 18, 35, 54, 64, 70, 75, 84, 90 and 96.
- (4) 5 ft. 6 in. and 7 ft. 4 in.
- (5) 5 lbs. 4 oz. and 4 lbs. 8 oz.
- (6) 6 rods and 66 ft.
- (7) 12 gal. 2 qts. and 10 gal.
- (8) \$6061 and \$7337.
- (9) 1 acre and 1728 sq. yards.
- (10) 1 pound Avoir. and 1 pound Troy.
- (11) 320 rods and 880 yds.
- (12) 16 days, 18 hours, and 21 minutes.

C.

- (1) 112 sixteenths and 133 sixteenths.
- (2) 78 twentieths and 102 twentieths.
- (3) 105 fourths and 126 twelfths.
- (4) 144 fifteenths and 108 thirds.
- (5) 8 thirds, 9 fifths and 15 sixths.
- (6) Find the least number which, divided by 3, 7, 11, or 13, will give a remainder of 1 in each case.
- (7) What is the smallest sum of money that can be paid in \$4 bills, in \$5 bills, or in \$10 bills?
- (8) What is the smallest sum of money that can be counted out in 5 cent, in 10 cent, or in 25 cent pieces?
- (9) What is the least weight of grain that will make an exact number of bushels of wheat, barley or oats?
- (10) What is the least number of marbles that can be divided equally among 12, 15 or 24 boys?
- (11) What is the least number by which 217 must be multiplied to yield a multiple of 279?
- (12) What is the least sum of money with which you can buy knives at 18 cents each, or balls at 24 cents each, or slates at 15 cents each, and have no change left?

D.

(1) What is the smallest sum of money that can be paid all in \$3 bills, in \$4 bills, in \$5 bills, in \$6 bills, or in \$10 bills?

(2) Find the least number which, divided by 6, by 8, by 15, or by 21, leaves in each case the remainder 3.

(3) What is the least number which, divided by 16, by 18, or by 24, leaves in each case the remainder 7?

(4) Find the prime factors of 126 and 1960; using these factors, find the L. C. M. of the numbers.

(5) What is the least number from which 1224 and 1656 may each be taken an exact number of times?

(6) Find the L. C. M. of 7, 9, 11, 13, 15 and 21; divide the L. C. M. by each of the given numbers, and find the sum of the several quotients.

(7) What is the smallest sum of money with which a cattle dealer can buy sheep at \$4.50 each, or pigs at \$7.50 each, or cows at \$45 each, or horses at \$135 each, and have no money over?

(8) A farmer's wife found that whether she counted her eggs by 6, or by 8, or by 9 at a time, she had an exact number of counts. How many dozen had she?

(9) What is the smallest quantity of wheat that can be carted away in either 20, 25, 30, 35 or 40 bushel carts?

(10) When a certain number of dozens of oranges are counted by fives, or by sevens, there are three over. Find how many there are.

(11) A battalion of soldiers numbering rather less than 1000 can be divided off into companies of 60, of 72, of 80, or of 90 men. Find the number in the battalion.

MISCELLANEOUS.

Exercise XLIX.—ON THE SIMPLE RULES.

A.

- (1) Find the value of $9087064 \times 89706 \div 336$.
- (2) The product of two numbers is 1270374, and half of one of them is 3129. What is the other?
- (3) One-third of the divisor is 1226, and one-fourth of the quotient is 676, and one-fifth of the remainder is 343. Find the dividend.
- (4) How many times must 133 be added to 70 times 87 to give twenty-six thousand, one hundred and seventy-three?
- (5) By what number must 1999 be divided, that the quotient and the remainder may be the same as the quotient and the remainder in the division of 109 by 11?
- (6) The sum of 27 equal addends is 98642880. If one of the addends be divided by 10, 8 and 4 in succession, the result is 7 times what number?
- (7) Multiply 7648 by 687. Divide 6897996 by the factors of 63. Give the sum of these two results.
- (8) From seven hundred millions, six thousand and seventy-five, take six hundred and seventy-three millions, one hundred thousand and ninety-seven. Multiply the remainder by 97, and then divide the result by 897.
- (9) If five times the minuend is 3784875, and seven times the remainder is 356335. Find the product of the subtrahend and the remainder.
- (10) Multiply, using factors 766485 by 63.

B.

- (1) Multiply 83102254 by 7090.
- (2) Divide 83102254 by 19435.
- (3) Find 78 times the sum of 894967, 38739, 69297

MDCCXCVII., 467896, and divide the result by the factors of 48.

(4) The quotient of two numbers is 498; one of the numbers is eighty-nine. How much is the other less than one million?

(5) What number must be subtracted from 461634 to make it exactly divisible by 126?

(6) How many times must 720 be added to 514 to make 987634?

(7) The divisor is 63875, the quotient 46938, and the remainder the largest integer possible. Find the dividend.

(8) Find the smallest number that must be added to 461633 to make it exactly divisible by 758.

(9) Multiply 867349278 by 70908, and divide the product by 23636.

(10) Divide 9 times the product of 89496 and eight thousand and seventy-four by LXXVIII.

C.

(1) Multiply 4786926 by 7869 and divide the product by 23607.

(2) Multiply 976531 by 999, short method.

(3) Add 3456 to the product of 8347 and eight, and then divide the result by 12.

(4) Find the value of $(36380250 \div 125) - (4024156 \div 8903)$.

(5) Add together 95949, 67896, 8939, 667586, 738496 and 89496. Take 59497 from the sum, multiply the difference by 98, and divide the product by 47.

(6) The dividend is 74198, the quotient is 2005, and the remainder is 24 less than the divisor. What is the divisor?

(7) Divide one billion by 256.

(8) The sum of the remainder and subtrahend is 100-190801. Find 20304 times the minuend.

(9) Multiply 4567895 by 192648 by short process.

(10) Square 6384 and divide the product by 3192.

D.

- (1) Multiply 4786926 by 7869, and divide the product by 23607.
- (2) Divide 72983000742 by 904307 and prove the result by multiplying the divisor by the quotient.
- (3) Multiply 428009700 by 908600, and prove the correctness of your result by division.
- (4) Find the sum, difference, product and quotient of 1863675 and 825; then add the four results.
- (5) Find the value of $(68379 \times 14739) \div 987$.
- (6) Multiply 1698732 by 9998, short process.
- (7) The quotient is 908 times 987, which is 227 times the remainder. If the remainder is 5 less than the divisor, find the dividend.
- (8) Find the difference between the squares of 7684 and 8316.
- (9) The quotient is 6987, the remainder 219, and the dividend thirty-two millions, five hundred and fifty-two thousand, six hundred and fifty-two. Find the divisor.
- (10) To give 238788, by what number must I multiply 1809?

E.

- (1) Divide 10841971600 by 18748005.
- (2) Multiply 9876543 by 216546, short process.
- (3) Of what number is 7006 both divisor and quotient?
- (4) The difference between 83372 and the product of the two numbers is 70300000. One of the numbers is 9402; find the other.
- (5) If the remainder is 68849 and the subtrahend 25763, find one-seventh of the minuend.
- (6) The divisor is 761, the quotient 1439, and the remainder 27. If 9 be added to each of these three, by how much is the dividend increased?
- (7) Multiply the sum of 59404 and 47675 by their difference, and divide the product by $7 \times 13 \times 19$.
- (8) What is the least number from which 1987 and 2971 may each be taken an exact number of times?
- (9) What multiple of 595 divided by 595 gives as quotient 595?

(10) Subtract 123456789 from 987654321 and prove the result by addition.

F.

(1) Add together 678, 593, 457, 389, beginning at the hundreds, next the tens, and lastly the units.

(2) Add together 12345, 23456, 34567, 45678, 56789, beginning at the left hand column and adding towards the right.

(3) The divisor is 54321, the quotient 12345 and the dividend 670605090; find the remainder.

(4) Multiply 507308 by 4620, and verify the result by dividing the product by the factors of the multiplier.

(5) Multiply 2468642 by 29 in one line.

(6) What number increased by the difference between 23089 and 19612 will make the sum of 20948 and 45021?

(7) Find the remainder in subtracting 6633 as many times as possible from twenty millions.

(8) If 217 be added to a certain number it will contain 231 just 129610 times. Find the number.

(9) What number divided by 537 will give 129 for a quotient and leave 76 as a remainder?

(10) Find the quotient obtained by dividing the product of the seven whole numbers next in order after 30 by the product of the first seven whole numbers.

G.

(1) Find the product of 897643 and 999998, short process.

(2) Find the product of 118813212 and 234567891, having six lines of figures when the solution is complete.

(3) The divisor is 17 times the quotient and 34 times the remainder. The remainder is 358, find the dividend.

(4) The product of two numbers is 760069388, and one of the numbers is 26078. What is the quotient when their sum is divided by 72?

(5) Subtract 97864 nine times in succession from one million.

(6) The sum of the quotient and divisor is 143715.

The remainder, 14259, is equal to their difference. Find the dividend.

(7) The multiplicand is 7869 and the multiplier is 2037. If the multiplier and multiplicand be each increased by 8, by how much will the product be increased?

(8) If the divisor were half of what it is, the quotient would be 64184. The dividend is 7894825 and the remainder 193. Find the divisor.

(9) Seven times the minuend is 163912, and one-seventh of the subtrahend is 2643. How much is the remainder less than ten thousand?

(10) The divisor is 2034 and the quotient 5901. If the divisor were 843, what would the quotient be?

H.

(1) Find the difference between the largest and smallest numbers ending in 357 between 39867 and 75129.

(2) The divisor and quotient are each 7641, and the remainder the largest whole number possible. Find the dividend.

(3) The remainder is 561 and the divisor the smallest whole number possible. If the quotient is as large again as the divisor, find the dividend.

(4) The product of two numbers is 112112. What would the product have been if both multiplier and multiplicand had been nine times as large?

(5) Subtract 357 from each of the following numbers : 635, 2678, 1037, 596, 834, 10238, 4300, 539, and 1000, and add the remainders ; short process.

(6) The product of the divisor and quotient is 195083 and the remainder 16758. Find the dividend.

(7) The sum of five addends is 243029 ; the first three addends are 18963, 26876 and 61589 ; the fourth addend is 17173 larger than the fifth. Find the fourth addend.

(8) The sum of the remainder and subtrahend is 60843, and the sum of the minuend and subtrahend is 103810. Find the remainder.

- (9) How many times must 347 be added to itself to make 98895?
- (10) How many times must 127 be added to 59 times 231 to give 24170?

Exercise L.—GENERAL REVIEW.

(1) A farmer gave 49 bus. of oats for 196 lbs. of cheese at 9 cents a lb. ; how much did each bushel of oats sell for?

(2) A contractor requires two million bricks. He has 560085 already. How many loads of 437 bricks does he need to complete the full number?

(3) A farmer bought 20 steers at \$33 each, and after keeping them 4 weeks at a cost of 50 cents each per week, two of them died. At how much each must he sell the rest to gain \$56 on the transaction?

(4) When 4 ft. 3 in. of brass wire costs 22 cents more than 3 ft. 4 in., what is the price of wire per yard?

(5) A woman sold 16 turkeys and 16 geese for \$23.20, getting 25 cents more for each turkey than for a goose. How much did she get for each?

(6) A grocer mixes 12 lbs. coffee at 28 cents and 26 lbs. at 23 cents, with 10 lbs. of chicory at 8 cents. At what price per lb. must he sell the mixture to gain \$4.50 on the whole?

(7) A drover bought a number of cattle for \$4050. He sold 34 of them for \$1926, gaining \$396 on those sold. Find how many he bought, and the cost of each.

(8) A woman sold two tubs of butter, weighing together 75 lbs., one being $5\frac{1}{2}$ lbs. heavier than the other. How much did each tub weigh?

(9) A butcher sold 8 turkeys and 8 geese for \$12, getting 30 cents apiece more for a turkey than for a goose. What did he get for each?

(10) Find the value of 57 cows, when 3 horses worth \$120 each must be given in exchange for 18 cows.

(11) A farmer bought 75 tons of hay at \$16 a ton, and

gave in part payment 56 sheep at \$3.75 each. The remainder he paid in butter at 33 cents per lb. How many lbs. of butter were required?

(12) A farmer paid \$22522 for two farms, and the difference in the cost of the farms was \$3578. The price of the farm for which he paid the smallest sum was \$64 an acre, and the other \$87 an acre. How many acres in both farms?

(13) Two articles together weigh 18 lbs., one being 3 lbs. 4 oz. heavier than the other. How much does each weigh?

(14) Sixty loaves of bread were sold for \$4.20, which was 60 cents less than cost. Find cost of 48 loaves.

(15) A man paid out \$1200 in \$2 bills and \$5 bills, giving two fewer twos than fives. Find number of fives.

(16) On the first of April L. J. Bland bought a cow for \$37.50; he sold her on the 1st September for \$29; her milk during that time was valued at \$28. If Mr. Bland's gain was \$7.50, find the cost of her keep per month.

(17) Find the daily wages of a man who works 10 hours per day, and who digs per hour 5 feet in length of a ditch 3 ft. wide and 4 ft. deep, if he charges half a cent per cubic foot.

(18) A piece of cloth 65 yards in length was cut into three pieces; the first was 9 yards shorter than the second, but 3 yards longer than the third. What was the length of the second?

(19) A person bought 213 acres of land for \$25200, and sold it again at \$116 an acre. Find gain or loss.

(20) A and B had \$2078. A spent \$263 and B spent \$315. Then A had twice as much as B. How much had each at first?

(21) A grocer bought a quarter of a ton of sugar for \$40, and sold it at 9 cents per pound. How much did he gain?

(22) A man who earns \$1200 a year, spends \$5 a week for board, \$4 a month for clothes, and \$2 a day for other expenses. How long will it take him to save \$972?

(23) A farmer paid for a cow and a sheep with the

price of 2 tons 8 cwt. of hay at 60 cents a cwt. The cow cost seven times as much as the sheep. Find the price of each.

(24) At \$1.75 a rod what will it cost to fence a field 660 ft. long and 264 ft. wide?

(25) A street one mile long and 66 ft. wide is to be built. On it there are to be 40 crossings costing \$15.80 each; two bridges, one costing \$68.40, the other \$165.00; a sidewalk on each side costing \$4 a rod; and 16 lamp-posts at \$3.50 each. If the cost of grading and paving be \$10 a sq. rod, what will the total cost of the street be?

(26) How many feet of lumber are required for a 12-inch baseboard for a fence around a field of 20 acres, having a frontage of 40 rods?

(27) On every square inch of the floor of a room, 60 yds. 1 ft. long, and 5 yds. 2 ft. wide, a 25-cent piece is placed. How much money is on the floor?

(28) A clock strikes all the hours in February, March and April. How many strikes does the hammer give the bell in that time?

(29) From a lot 80 rods square I sold 80 square rods; what is the value of the remainder at \$80 per acre?

(30) A cellar is 18 by 20 feet, how many bricks 8 by 4 by 2 inches, laid on their sides, will cover the floor, and what is their value at \$14 per thousand bricks?

(31) Find the cost of building a six-rail fence round a field 65 rods long and 40 rods wide, the rails being 11 ft. long and costing 8 cents each.

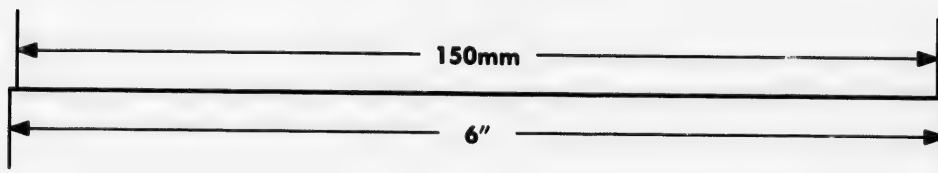
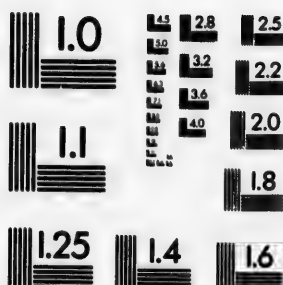
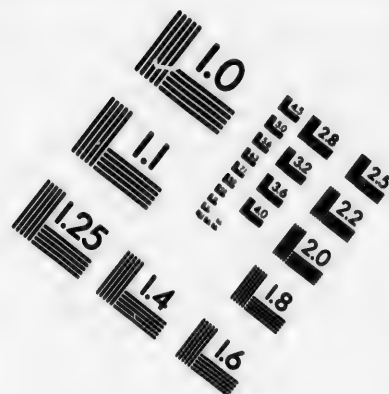
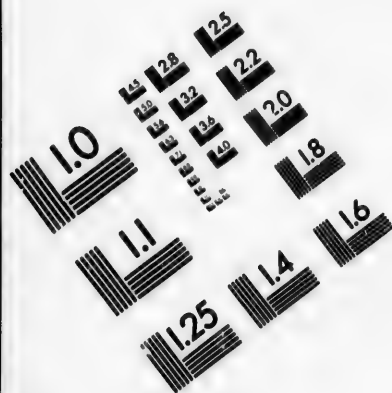
(32) What would it cost for stone to pave a walk round the outside of a yard 40 rods long and 66 yards wide, if the walk be 5 feet wide and the pavement cost 10 cents per square foot of surface covered?

(33) A gentleman sells at \$3.60 a square foot a town lot 60 ft. wide and 120 ft. in depth. Find what he should get for 3 acres at the same price.

(34) A square block 360 feet to the side has a sidewalk of two-inch plank around it. The sidewalk is 4 ft. wide. Find the value of the plank at \$15 per thousand.



IMAGE EVALUATION TEST TARGET (MT-3)



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- (35) How many pupils would a rectangular room $36' \times 22' 6''$ accommodate, allowing 10 sq. ft. of floor space for each pupil?
- (36) How many miles and yards will a buggy have travelled when the fore wheel, which is 14 ft. in circumference, has made 240 turns more than the hind one, which is 16 ft. in circumference?
- (37) Find the cost of digging a cellar 24 ft. long, 18 ft. wide and 6 ft. deep, at 85 cents per cubic yard.
- (38) How many cubic inches in a block of stone 2 ft. 6 in. long, 2 ft. 3 in. wide, and 5 ft. 4 in. high?
- (39) Find the cost of excavating a cellar 20 ft. square and 8 ft. deep, at 90 cents a cubic yard.
- (40) The length of a race course is 48 rods, 2 yds. 2 ft. How many times must one go round it to walk 15 miles?
- (41) A and B had \$3207. A spent \$627 and B spent \$273; then B had twice as much as A. How much had each at first?
- (42) At \$12 per thousand, how much will be the cost of the lumber for a close board fence 80 rods long and 6 ft. high?
- (43) How high must the wood be piled in a car which is 28 ft. long and 8 ft. wide, to contain 14 cords?
- (44) A farmer sold a horse for \$128.50, 17 cows for \$14.25 each, and 18000 lbs. hay for \$9.50 a ton. With the proceeds he bought sheep at \$3.65 each, and afterwards sold the sheep for \$5 each. How much did he gain?
- (45) The wood contained in a box 3 ft. 4 in. long, 1 ft. 8 in. wide, and 2 ft. 6 in. high, keeps a stove running for 30 hours. For how many days will 25 cords of wood keep the stove running?
- (46) A yard 31 ft. 5 in. long and 26 ft. 11 in. wide, is to be laid with paving stones 2 ft. 5 in. by 1 ft. 7 in. Find the cost at 65 cents a stone.
- (47) If 12 cords of wood equal $3\frac{1}{4}$ tons of coal, how many cords of wood would last a family that burns 26 tons of coal in a year?
- (48) If 12 apples cost 8 cents, what will a barrel of 147 dozen cost?

(49) If 50 men do a piece of work in 12 days, working 8 hours a day, in how many days would 30 men do the same piece of work, working 10 hours a day?

(50) If 2 men or 3 women earn \$1.80 a day, how much should 10 men and 27 women earn in 15 days?

(51) A factory tailor can make 10 shirts in 4 hours; whether will be more profitable for him, to be paid 18 cents an hour or 8 cents a shirt?

(52) Two railroad trains are 5000 miles apart, and approach each other, the one at the rate of 19 miles an hour, the other 24 miles an hour. How far will they be apart in two days?

(53) If a boy waste on the average 2 minutes every hour, how many minutes will he waste in 4 years?

(54) If 3 horses, 4 oxen, or 5 cows can be pastured for one month for \$6.60, what should be paid for pasturing 3 horses, 4 oxen and 5 cows for one month?

(55) How often does the L. C. M. of 4, 21, 36, 45, 91 and 180 contain the G. C. M. of 5642 and 7462?

(56) Divide the L. C. M. of 18, 21, 42, 45, 90, 180 and 640 by the G. C. M. of 3232 and 1952.

(57) If the area of a field is 326700 square feet, and the length 540 rods, what is the width?

(58) Find the value of the rails in a straight fence 40 rods long, each rail being 11 ft. long, and the fence 7 rails high, at \$22.50 per M.

(59) In eight equal loads there were 9 tons, 10 cwt. 32 lbs. How many tons, etc., were there in 5 loads?

(60) A can do a piece of work in 6 days, B can do the same work in 8 days. If both work at it for 2 days, how long will it take A to finish the work?

(61) When hay is selling at \$6 a ton, and oats at 30 cents a bushel, it costs a man \$9 for hay and \$6.75 for oats to feed a span of horses for one month. How much will it cost him when hay has risen to \$8 a ton, and oats to 34 cents a bushel?

(62) How many feet of lumber in a plank 18 ft. long, 12 in. wide and 3 in. thick?

(63) A garden is 48 yds. long and 29 yds. wide. There are two paths, each 6 ft. wide, running across each other.

through the centre of the garden, from side to side and from end to end. How much, at half a cent the square yard, will it cost to dig all the garden except the paths?

(64) How many cubic yds. of masonry are there in the foundation of a house which is 29 ft. long and 18 ft. wide? The foundation walls are 8 ft. high and 18 in. thick.

(65) A bin of wheat is $8' \times 6' \times 4'$. How much would the whole weigh at 61 lbs. to the measured bushel?

(66) A field 60 chains long and 80 rods wide will produce 21600 bushels of potatoes. How many bush. is that per acre?

(67) How much will it cost, at \$1.12 per sq. yard, to pave a street 120 rods long and 90 ft. wide?

(68) A rectangular cistern is 8 ft. long, 6 ft. 9 in. wide, and 4 ft. deep. What will be the weight, in pounds, of water in the cistern when full? How many barrels will it hold?

(69) Find the cost of 720 boards, each 14 ft. long, 8 in. wide and $1\frac{1}{2}$ in. thick, at \$12 per thousand ft.

(70) A sack of pease weighs 2 cwt. 55 lbs. 8 oz., and a farmer's wagon is loaded with 25 such sacks. How much less than 3 tons 4 cwt., has he on his wagon?

(71) A cistern is 5 ft. long, 4 ft. wide and 8 ft. deep. How many additional cubic ft. of earth must be removed to make it 7 ft. long, 6 ft. wide and $8\frac{1}{2}$ ft. deep?

(72) A schoolboy gets 10 street-car tickets for a quarter, and he attends school during 40 weeks of the year. Find his annual outlay for car fare at 4 rides a day.

(73) If a milkman averaged 28 gal. 2 qt. 1 pt. a day for a week (Sunday included), find how much he would receive in 5 weeks at 6 cents a quart.

(74) A bicycle wheel passes over $8\frac{1}{2}$ ft. in turning once. Find the number of revolutions it makes in going 4 times round a half-mile course.

(75) If ten words or less sent by telegraph cost 25 cents, and each word over ten costs two cents, write out a telegram and calculate the cost of sending it.

(76) A man's money is made up of 5-dollar bills,

4-dollar bills and 50-cent pieces. There are five times as many 5's as 4's, and twice as many 50-cent pieces as 5's. Altogether he has \$102. How many of each kind has he?

(77) How much must be added to the product of the sum and difference of 8976 and CDIX. to make it exactly divisible by 37?

(78) I purchase 10000 lbs. hard coal. What must be the depth of my bin, which is 11 ft. long and 5 ft. wide, to hold it? A ton measures 33 cubic feet.

(79) Reduce to acres, yds., etc., 11128767 square inches.

(80) What is a bin of wheat worth, if its length be 14 ft., its width 7 ft., its height $5\frac{1}{2}$ ft., and its cost 64 cents a bushel?

(81) A house is 44 ft. long and 21 ft. wide, outside measurement. What will it cost to put two floors in it of $1\frac{1}{2}$ inch lumber, the walls being 18 in. thick, and lumber being worth \$15 per thousand ft.?

(82) A square block of land is 1 mile 80 rods on each side. The road around it is 4 rods wide. Find the number of acres in the block of land, and also in the road.

(83) A school-room is $40 \times 28 \times 14$ feet, there are 6 windows and 2 doors each 3×6 ft. Find the cost of plastering the walls and ceiling at 12 cents per square yard.

(84) There are 6 ft. in a fathom, how many fathoms deep could a cable 12 rods long reach?

(85) There are three prime numbers. The product of the first and second is 2537, of the first and third is 2881, and of the second and third is 3953. Find them.

(86) Divide sixty thousand and sixty-nine by 420, using all the factors of the divisor, and find true remainder.

(87) A field is 9384 inches long and 7314 inches wide. Find its area in acres, yards, etc.

(88) A cistern contains 2500 gallons. If it measures $5\frac{1}{2}$ ft. 4 in. by 6 ft. 3 in., find its depth.

(89) A plate of copper 3 ft. wide, 3 ft. 2 in. long, and half-an-inch thick, is rolled into a sheet 2 inches thick and 1 ft. 7 in. wide. Find its length.

- (90) In a field 649 ft. long and 597 ft. wide, how many acres, yards, etc., in it?
- (91) A grocer mixes together 7 lbs. tea worth 54 cents a lb., 11 lbs. worth 47 cents, and 13 lbs. worth 43 cents. Find the value of one pound of the mixture.
- (92) A dealer bought 248 geese at \$6.24 a dozen, and sold them for \$1.25 a pair. Find his gain.
- (93) From April 8th at 9 a.m. to November 18th 5 p.m., how many minutes?
- (94) How many boards 14 ft. long and 10 inches wide will be required to build a sidewalk 40 rods long and 4 ft. 8 in. wide?
- (95) Out of a cistern containing 114 gallons, 28 pails were taken. If the pail held 2 gal. 3 qt., how much water still remained in the cistern?
- (96) The wheel of a carriage is 9 feet in circumference. How many times will it turn in going over 5 miles, 178 rods, 4 yards?
- (97) A farmer sold 147 lbs. of butter at 18 cents a pound, and 2456 lbs. of cheese at 9 cents a pound. How many lbs. of tea at 36 cents a pound can he buy with his money after redeeming a note for \$230 and paying \$5.26 interest thereon?
- (98) Divide \$309 among Mary, Jane and Annie, giving Mary \$9 more than Annie, and Annie \$6 less than Jane.
- (99) Find the total area of the walls and ceiling of a room 18 ft. 8 in. long, 15 ft. wide, and 12 ft. high.
- (100) At 22 cents a square yard, what will it cost to plaster the walls and ceiling of a room $27 \times 18 \times 10$ feet, deducting 90 square feet for openings?

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